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UME 35, No. 6

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AN ASSOCIATION
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AMERICAN DYESTUFF REPORTER

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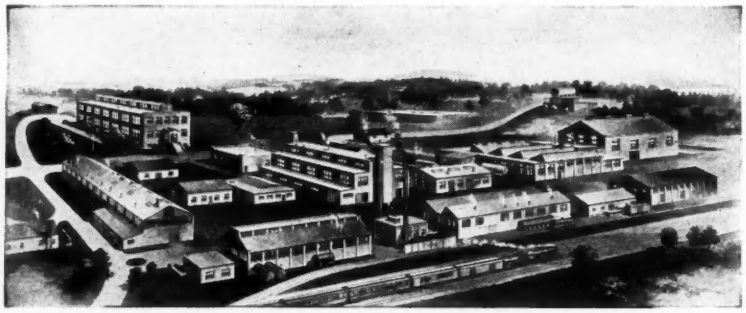

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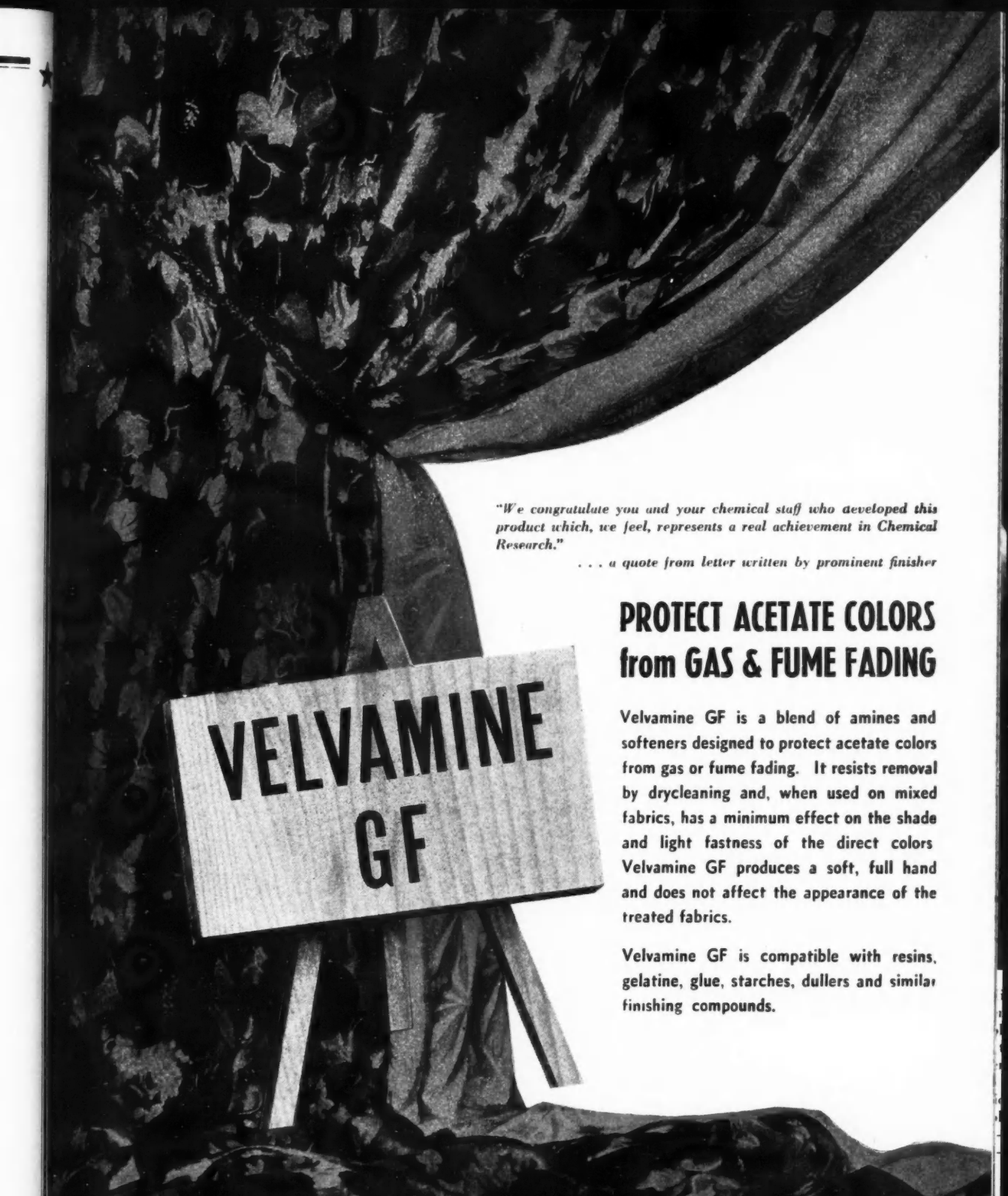

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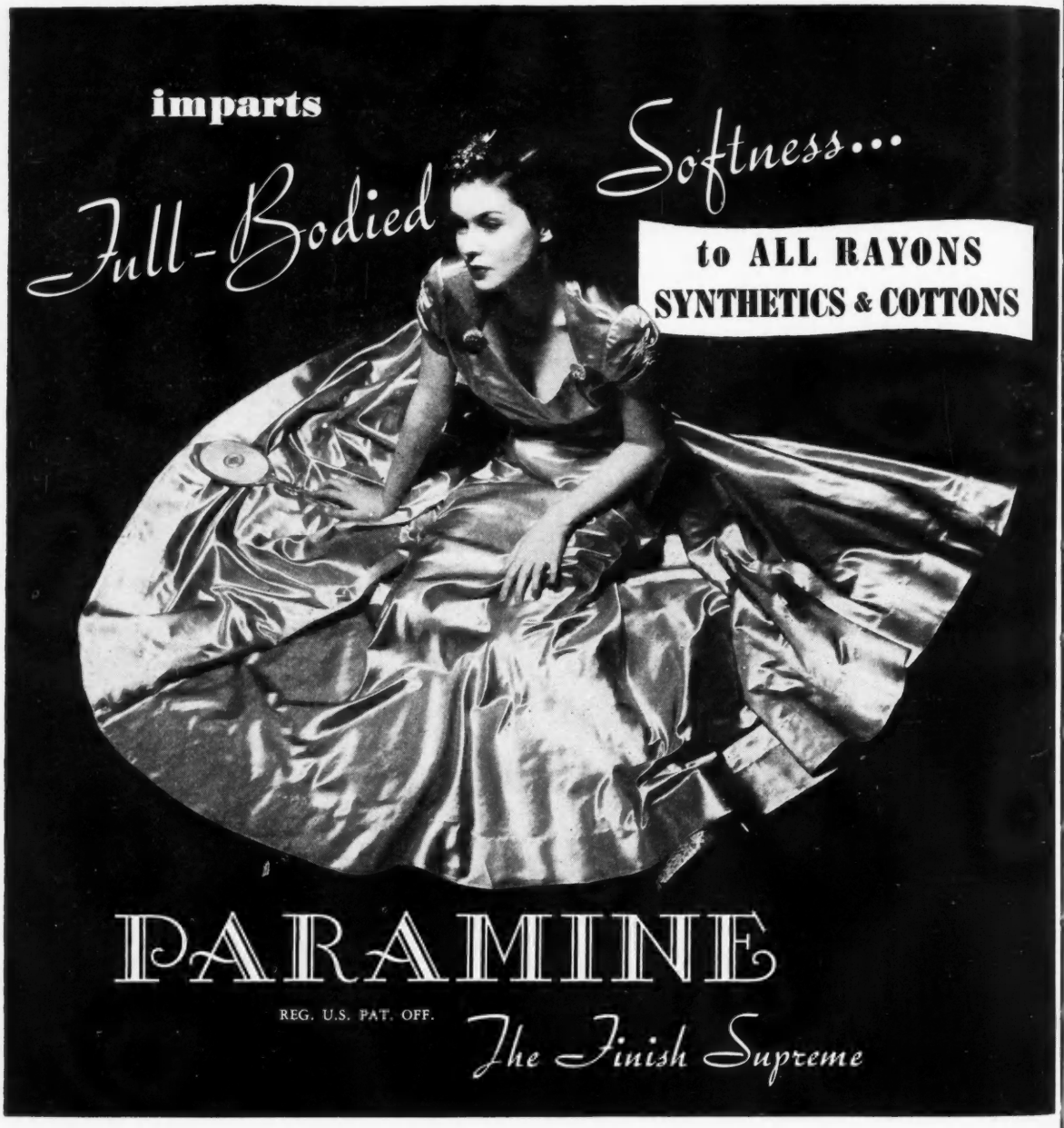

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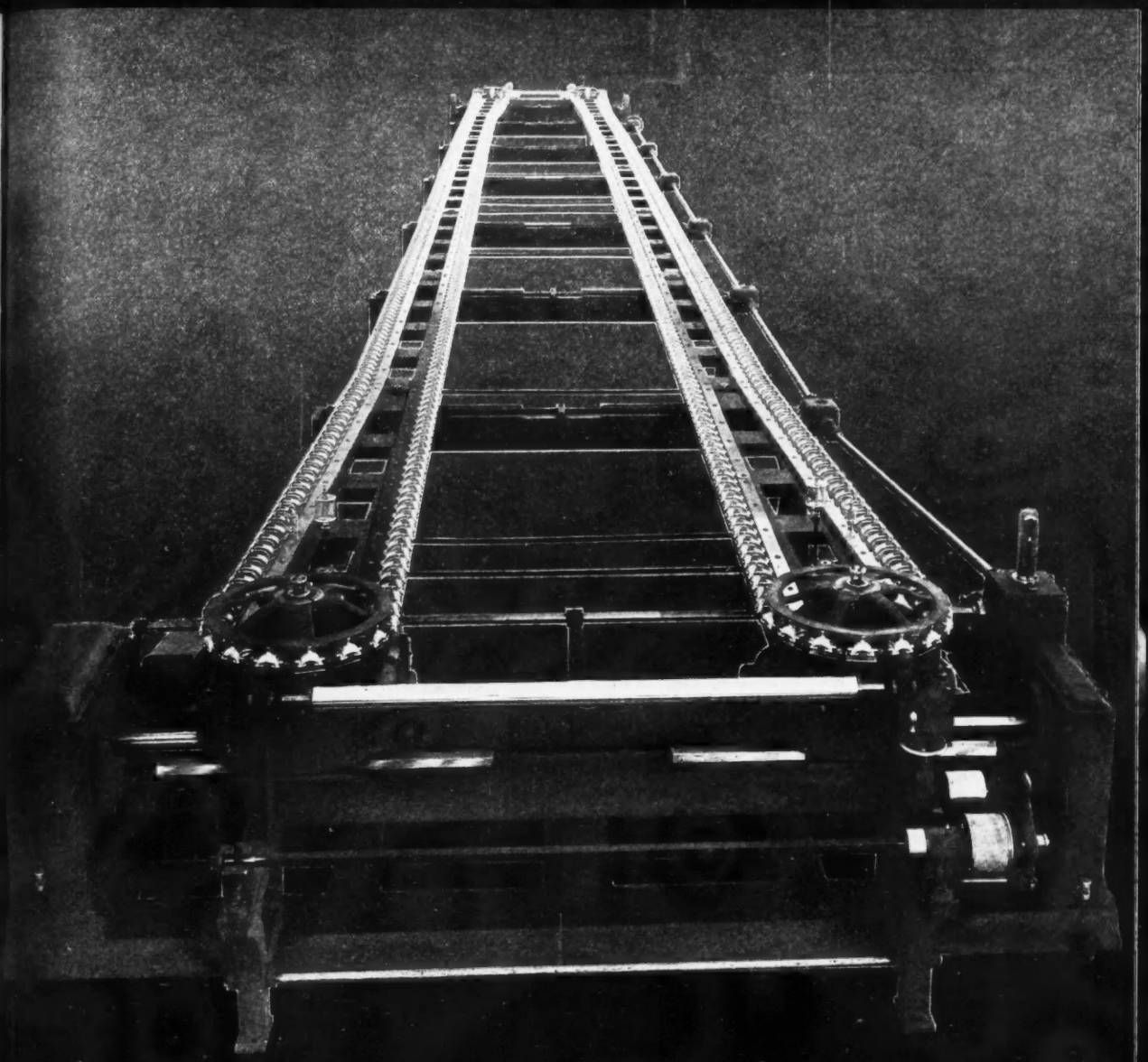

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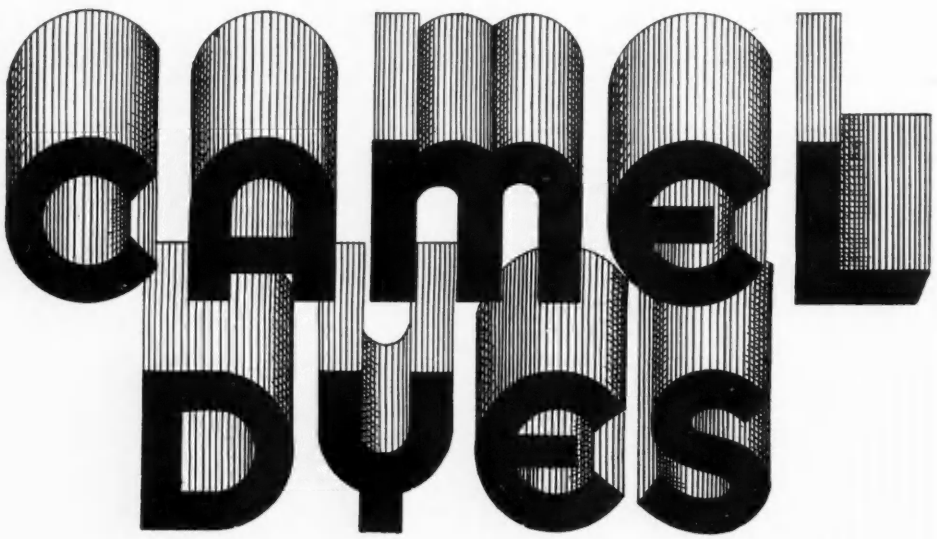

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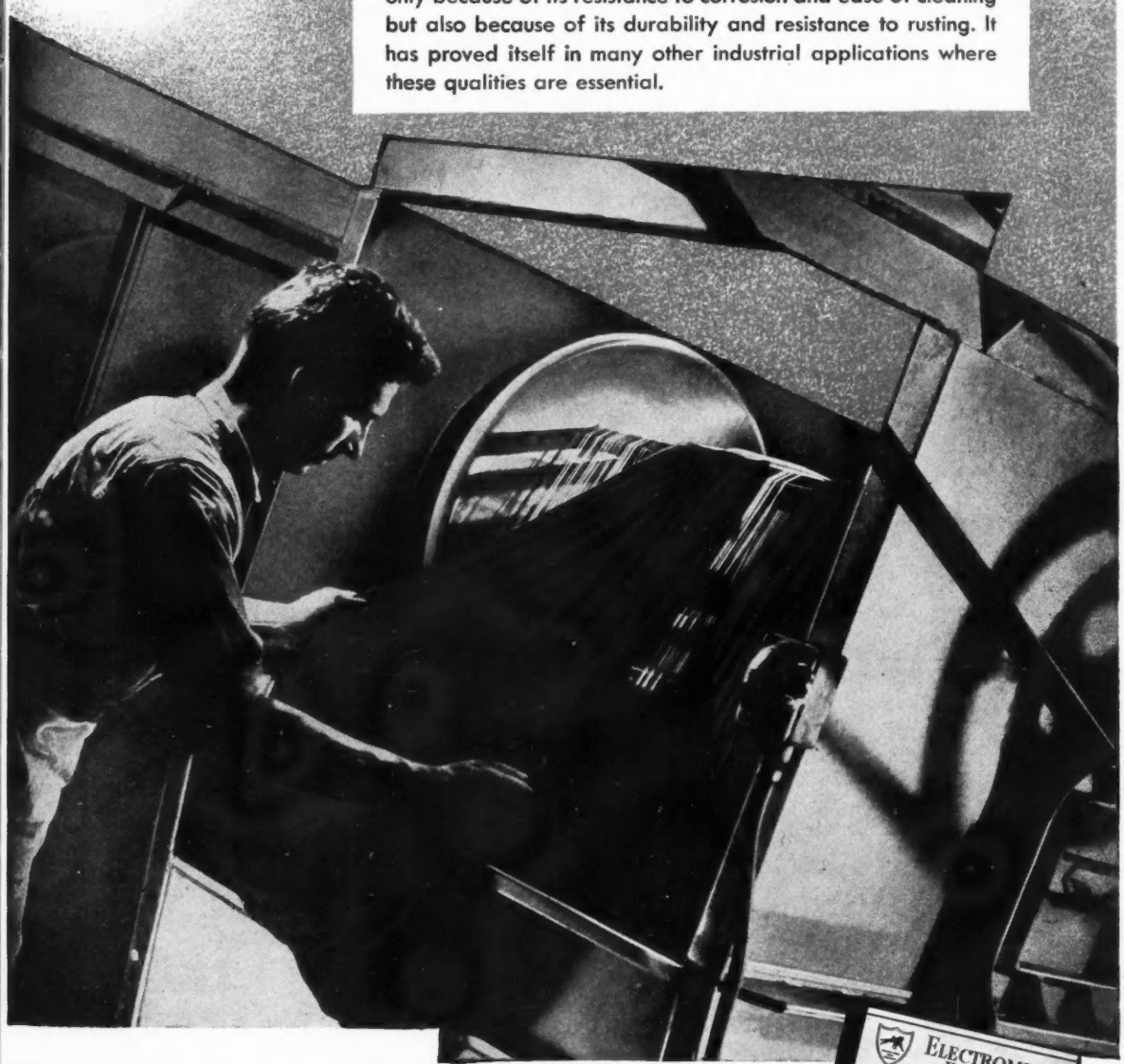

Other uses of stainless steel are described in ELECTROMET REVIEW, published by ELECTRO METALLURGICAL COMPANY, a Unit of UNION CARBIDE AND CARBON CORPORATION. ELECTROMET does not make steel, but produces the ferro-alloys used in its manufacture. If you need this complimentary publication, write to ELECTRO METALLURGICAL COMPANY, 30 East 42nd Street, New York 17, N. Y.

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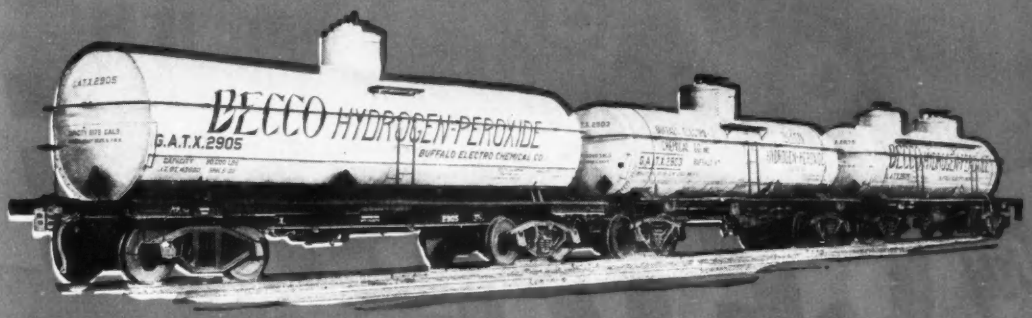

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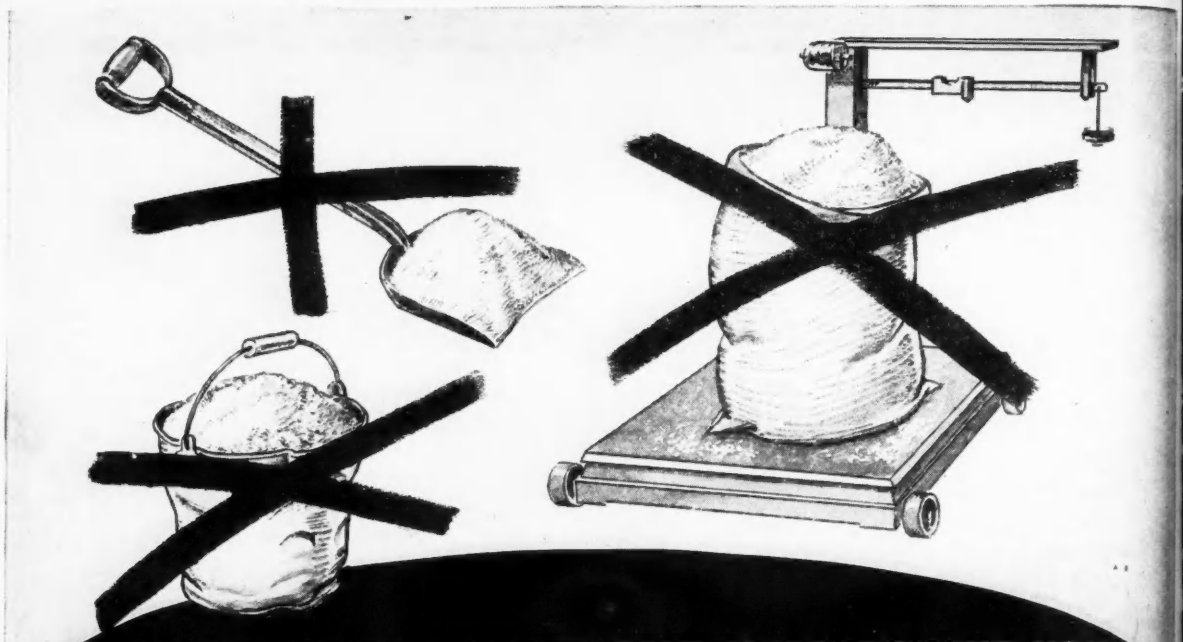

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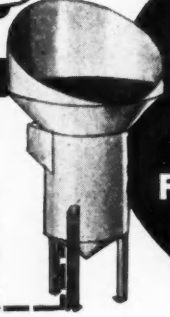

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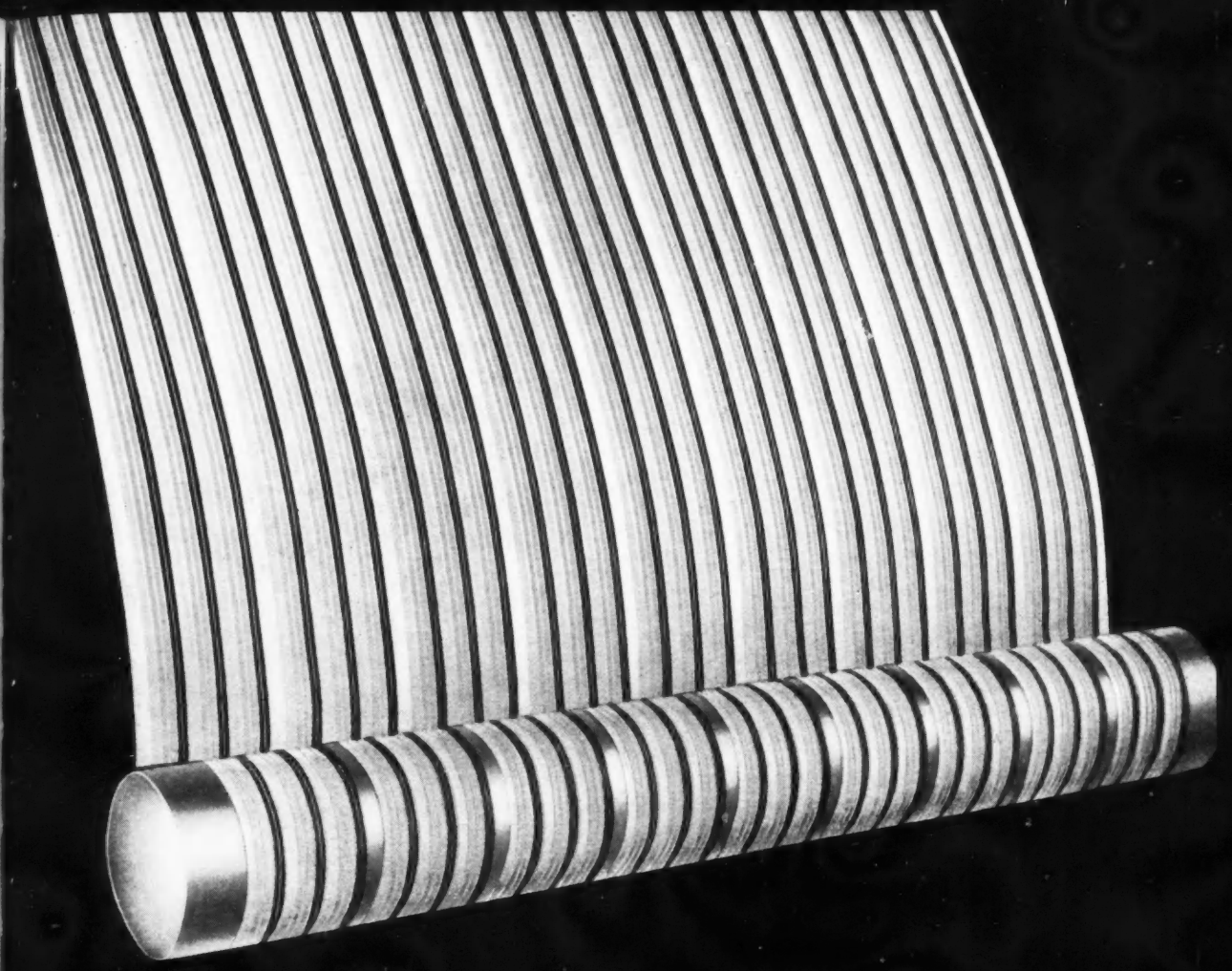

THIS SHIRTING PATTERN WITH ONE ROLL OR THREE ?

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Economy • Ease of Application • No Impairment of Hand

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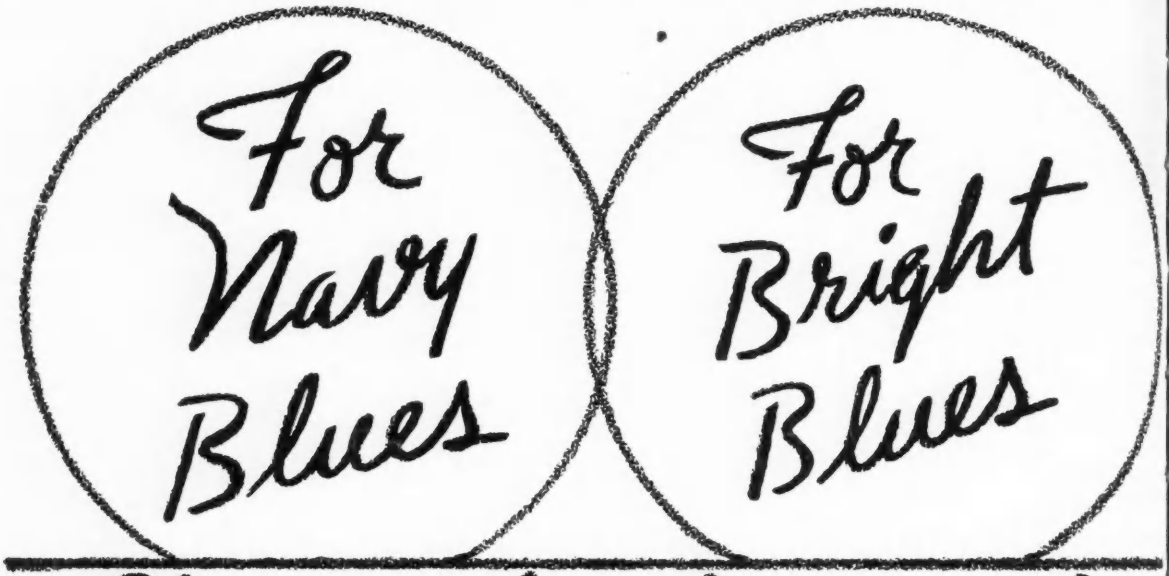

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PHARMASOLS are stabilized solutions, adjusted to the most practical concentration, which can be easily applied with a maximum of efficiency.

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MARCH 25, 1946

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145TH RESEARCH COMMITTEE MEETING

Open Meeting held during Victory Convention at Pennsylvania Hotel, New York, on January 5th—Set-up of Committee Reviewed—Work of Executive Committee on Research Reviewed—Many Sub-Committee Reports Presented.

THE session convened at 9:45 o'clock, Dr. Louis A. Olney presiding.

Chairman Olney: I think we may as well open our meeting, ladies and gentlemen.

We have come together for the 145th meeting of our Research Committee. We have made it an open session so that all attending the convention may come in and listen, and they are welcome.

As some of you may not be fully acquainted with the setup of our Research Committee, and our research work, I will say that we have a general and permanent Research Committee of about 50 members. In addition to that we have as ex-officio members the councilors and the chairmen of our sub-committees.

We have worked very largely through sub-committees, of which we have approximately 20 actively working at the present time, and 15 or more who have completed their work and are classified as reference committees. If their particular subject comes up again, it is referred to that committee. Furthermore, if these subjects become very important again, these reference committees are brought back into active work.

Several years ago we inaugurated an Executive Committee on Research. That Executive Committee takes over very largely during the interval between regular Research Committee meetings. These regular Research Committee meetings come approximately four times a year. But this Executive Committee on Research meets more frequently.

For some time we have had it in mind to secure a full time director of research. That has recently been accomplished. Lieutenant Colonel Stiegler, who has now been released from the Army, has been appointed in that position. Dr. Stiegler graduated from the Lowell Textile Institute in 1918. He did post-graduate work at M.I.T., and later took his Doctor's degree at Northwestern University. He was in the Chemical Warfare Service during the first World War, and has been very active in the same service during this second war. Between the two he had held a number of very important industrial and scientific positions.

It gives me great pleasure at this time to present Dr. Stiegler. If he cares to say anything, we will be very glad to hear from him. (Applause)

Dr. Stiegler: I won't take valuable time now, except to express my own personal pleasure and pride in coming back to the "family" again in the textile field, more intimately, perhaps, than ever before and in a broader way. As far as research goes, I think it is hardly necessary to extol the value of research, or the dollar value of research, to anyone who attended this meeting and who heard President Appel's speech. There is plenty of "meat" in that speech. I think many of the corporate guests and business executives and managers who are here today need not be told what research means to them and will mean in the future.

Chairman Olney: I hope any of you will counsel with Dr. Stiegler in regard to the research work of the Association at any time. If you have any criticisms or suggestions he will be glad to hear them.

I want to say that I am going to depend on Dr. Stiegler in the future for much of the active work of this Research Committee.

The Executive Committee on Research has been a great help. It was appointed partly to assist me in conducting the general work of the Research Committee. Mr. Leonard Little is chairman of that committee, and he has been a great help to us in many ways. He is going to report for the Executive Committee on Research at this time.

* * *

REPORT OF EXECUTIVE COMMITTEE ON RESEARCH

Leonard Little: My report will be very brief. Our job is more supervisory and organization, and I know you are much more interested in the detail of the sub-committee work, which will be reported here today.

The Executive Committee on Research was appointed just a little over two years ago, composed of the President, Mr. Appel, past president T. R. Smith, Director of Research Dr. Olney, and three members who rotate after a period of three years. After this year one of the three members will be changed and a new member will come in. So the committee will not be a fixed, permanent thing.

The three members are P. J. Wood, a past president; J. R. Bonnar, who is our very able and industrious secretary, and who has been very, very helpful; and myself as chairman.

We certainly all appreciate the fine job that Dr. Olney has done. And as we get into the work of this research endeavor we are amazed to see how he alone over these years has been able to carry so much detail and do such a wonderful job. He certainly deserves help, even though he stays with us for many years, and I hope he will.

We are definitely trying to reorganize the research work. We are particularly trying to shape our test programs so we will get end use values determined in such a way that they will be of more and more value to the industry. We have, as you know, many tests, and very valuable tests, but a number of them are straight test methods and do not carry into the test what happens during the life of a garment, or whatever material is being tested. That is a main objective. We feel as time goes on there will be more and more demand on the part of the consumer, probably backed up by governmental insistence, that goods be labeled, and when fastness properties are claimed that they will have to state just how fast they are. We find in reviewing our tests that they are not complete in carrying out the tests in a life cycle.

I think one of the best illustrations of the job we are trying to do is perhaps that of the Wash Fastness Committee. I don't mean that the other committees are not doing equal good and important work, but here we have a concrete example of an endeavor to find out what happens to a garment in washing through its life. I will not go into detail as Mr. Dorn will cover that fully.

We are very happy to have Dr. Stiegler join our force. We know this job cannot be done entirely by sub-committee work. However, we certainly don't expect any giving up or elimination of the endeavors of the sub-committees. That work certainly has been done most magnificently and has been supported by the industry. Some of our important corporate members know just how much that work may cost them. We hope to continue to have this support and do that work, in addition to

the work we are endeavoring to add to it.

Also, at Lowell, we are setting up a definite pragram to improve the physical testing and equipment, build a conditioning room, and so forth. We feel you will all be proud to go to Lowell and see it. I know both Dr. Olney and Dr. Stiegler will be happy to have you there any time you can go.

Dr. Olney has touched on the organization of the sub-committees. We also hope to increase our sub-committee work in a few cases. We can't expect to do it in too many cases, but paid workers, or paid work, is probably what it needed, so that the work can be carried on with greater dispatch and with not too much drain on the time of any one individual. We are very anxious to have each sub-committee stress the need of completing new tests and test methods in a reasonably prompt time, and we are very anxious to support them in their work.

We would like very much to see each section take on a research project and sponsor it. I have spoken about this several times before, but we really haven't crystallized it yet, however, I do hope we can in the next year. We would have the advantage of a group of men who are physically located near each other, and we hope by that method not only to broaden the scope of the work we can do, but also to make each section feel that they have a very distinct part in the activities of the Association. I wish the chairmen of each section would really take this seriously and be thinking about it, because we are certainly going to follow it up. We would like to know the type of activity you feel best fitted to follow and that in which you are most interested.

One thing is quite important. I have heard several remarks—and it is only natural—that the Association has been quite active in soliciting corporate membership funds and it has not been spending the money annually that has come in. Last year we got a little over $35,000 for research work and we only spent perhaps $20,000. The reason for that was that we just couldn't get the organization together. We now have Dr. Stiegler with us, and he is setting up a permanent organization. We hope that he will add three or four workers up there within the next six months, and we will very shortly be in a position where we can use more than the amount coming in. So we would like very much for every member of the Association to elect himself as a committee of one to help us either to get new corporate members, or have present corporate members increase their contributions. I certainly do want to spike the idea that we do not need all the money we have now, or that we have more funds than we need for the job we have to do.

Industry is faced with a tremendous job in developing the proper test methods that will indicate the end use value of fabrics. That job largely falls on the shoulders of this Association, and it is going to take time, money and a whole lot of work to put it over. We certainly don't want to do a half-way job.

I want to personally compliment the chairmen of the sub-committees who put on such a fine display. I know just how much work it meant. I think it is a very good job, and I think it depicts just what we want to show, that there is a tremendous amount of work back of a simple little test method. It means a lot of study and in many cases a tremendous amount of samples, cloths, and a great many hours of testing. I appreciate the job they have done, and I am sure the officers of the Association feel exactly as I do.

* * *

Chairman Olney: We ordinarily have a well prepared agenda for our Research Committee meeting, but this meeting being somewhat different from the usual meeting, we have not prepared such an agenda for circulation. We are omitting as far as possible the routine work and business of the committee, and in place of that we are going to call upon certain of the chairmen of active sub-committees to present reports in regard to their work.

The first one will be the report of the Committee on Insect Pests; in other words, moths and carpet beetles, and so on. That committee has done an enormous amount of work in the last two years. Mr. Kellner is chairman of that committee, and we will be pleased to hear from him now.

* * *

COMMITTEE ON INSECT PESTS

Arthur J. Kellner: As many of you probably know, this committee is a joint committee embodying the Textile Chemists, the ASTM and the National Association of Insecticide and Disinfectant Manufacturers. Through the past years we have had quite a few meetings, and we have done quite a bit of work, in an attempt to add refinements to our test method on the evaluation of insect pests.

Our studies have shown that the important factor in determining the effect of moths on woolen fabrics is the amount of visual damage which takes place. We also consider the amount of excrement given off by the beetles, and we also have the other test, the loss in weight test.

However, the question arose as to how to measure this visual damage. We then set to work to develop an instrument to measure this in a more scientific way than just by examining it and saying whether it is damaged or not damaged. Through those efforts we have developed the instrument called the Visualometer. First we have a frame which is strung with a fiber. Each one of these squares represents 1 per cent on a one-inch area of specimen. Here we have a box which contains a light inside, and also a light above, with a reflector.

By placing our specimens in this box, after they have been exposed to the carpet beetle larvae together with a specimen which has not been exposed to the action of the larvae, and placing the frame over the specimen and turning on the light inside the box, we are able to count the amount of damage which is due to holes or cutting of the fibers. The light coming through the box shows the damaged area.

When we have finished with that counting we then put the inside light out and light the light above the specimen and observe the amount of surface damage or clipping which has taken place. In this test we measure both sides of the specimen and report the results in percent.

We had hoped to be able at this meeting to give an indication of the amount of damage which would be permissible under this test, since it is a forced-feeding test and you will get some damage. However, further work is necessary on that and further inter-laboratory tests are being conducted.

In addition to this test we have a life-cycle test. If you people have had an opportunity to examine the exhibit you will see the cabinet on display there. In that test we charge the bottom of the cabinet with several thousand carpet beetles, adults, and clothes moth adults, then hang our specimens on the rods above them. The adults will then fly or move up to the specimens and lay their eggs, and the larvae will hatch out. If the specimens are poorly treated or untreated it is presumed that the larvae will eat the material and give an indication of the efficiency of the compound. This test takes six months to do, and at the end of three months we recharge the cabinet with new adults.

We feel that this test perhaps should be used as the final criteria for evaluating insect pests.

Our future work is going to be on other types of insects. The first one under study is the silver fish. We are now running laboratory experiments in an effort to determine the best manner of testing fabrics to determine their resistance to silver fish. We also have to set up means of rearing the silver fish. This work is being done now, and we hope in the very near future to have a standard test procedure for evaluating this type of insect.

Chairman Olney: Our next report is from the Committee on Detergency. This committee was formed about a year ago, and it has been very active since them. Mr. Prisley is the general chairman of the committee, but we decided to divide it into two sections. One is in regard to wool fabrics and the other in regard to cotton, rayon and other fabrics. Mr. Nutting is the chairman of the section in regard to wool, and Mr. Holland is the chairman of the section in regard to cotton.

I would say that one of the main projects so far has been to produce the laboratory machine apparatus for carrying out tests. You may have all seen it in the exhibits.

* * *

DETERGENCY COMMITTEE

Frederic A. Prisley: A meeting of this committee was held in the Hotel Pennsylvania, New York on January 3rd. The first laboratory Detergency Comparator was delivered to the Association on Monday, December 31, 1945 and as a result of the efforts of the Exhibit Committee, was brought down to New York in time for the meeting.

Because of lack of opportunity, we had no specific plans to announce for the work to be carried out with the machine, nor could we present any data, etc.

The various features of the machine were pointed out and the meeting was then thrown open to a general discussion of the nature of the project to establish the value of the machine. There were also some very constructive suggestions noted for changes in the design to widen the range of fabric constructions which might be test scoured.

As soon as possible, it is planned to have a great deal of work done in the Association laboratories in Lowell and at the next meeting of the Research Committee, we are confident that enough data will be accumulated so that we will be very nearly ready to announce a proven laboratory machine.

John Dalton very kindly acted as Secretary for the meeting.

There was an attendance of thirty-six.

* * *

I would like at this time to give the background of the machine itself. When this committee was formed it was to fill a want that has been expressed chiefly on the part of the woolen worsted chemist and mill men. It has been very difficult to evaluate detergents in a launderometer. We decided that was because the Laudnerometer lacked the squeezing action which is present in washers and fulling mills. A great many people have worked on the evaluation of detergents, basing the work on measurements on the physical properties of detergents such as emulsifiable potential, the lowering of surface tension, and so on.

A consensus of opinion indicated that these methods failed to evaluate a detergent so that its performance could be predicted when it was used in practice. So when the committee was formed, the wool section at least knew just about what had to be done, which was the design and production of the machine which would, in the laboratory on a small piece of cloth, indicate the value and efficiency of detergent solutions in practice.

Mr. Ryberg, in the Lowell Textile A.A.T.C.C. laboratory, put together a model which was surprisingly good. He took it south. Dr. Holland had a meeting in Charlotte, and they thought it might be used for work in connection with problems of scouring cotton and rayon. We had that same model at a meeting in Providence. It was quite an interesting show to people working on cotton and rayon, without any great demand for very important changes in design. Mr. Ryberg did some scouring with the machine in the laboratory at Lowell, and we felt that on the basis of those tests we were justified in asking the Association to put up some money for the manufacture of the real job. However, I don't think we anticipated that it would take so long.

The real work of the committee now begins. We hope to, within a few weeks, lay out a program which will be carried out by Dr. Stiegler at the Lowell laboratory. We are quite confident that at the time of the next Research Committee meeting we will be able to say that this thing will work.

Mr. Nutting is chairman of the wool section, and he will now come up here and describe the machine in detail.

Clarence L. Nutting: The Detergency Comparator is on display in the exhibition room.

The machine is simply a dual type model of a standard dolly type cloth washer. It consists of two small identical tubs, complete with variable level drains, suds boxes with drains, adjustable pot-eyes, guide rolls, take-off rolls and squeeze rolls.

The squeeze rolls are equipped with readily replaceable synthetic covers. Flanges on the squeeze rolls and baffles are so arranged with respect to the squeeze rolls as to restrict the detergent solutions to their respective containers or tubs. Suitable weights and weight arms permit variable loading of the top squeeze rolls equally.

The squeeze rolls are driven by a small reduction gear motor by means of a belt and a pair of four step cone pulleys. By means of various pairs of pulleys any linear roll speed can be obtained and duplicated at will.

The two identical tubs are suspended in a water bath which is contained in an insulated tank. The tank is fitted with electric immersion heaters, motor-driven external circulating pump and thermostat to maintain temperatures from room temperature up to that approaching the boiling point of water.

The capacity of the tubs was designed to accommodate samples approximating 25 to 40 grams and up to about 800 ml. of the bath.

At the back there is a rinse water supply tank fitted with an immersion heater, thermometer and thermostat from which rinse water can flow by gravity simultaneously to both tubs.

Except for a few minor parts, the machine is constructed entirely of chrome nickel stainless steel, but can be constructed of monel metal or other metals equally well.

The committee has tried to design the machine so that it will be equally useful for wool, cotton and rayon in either the knitted or woven form. Where a minimum of working of the sample is required, the pot-eye rack, front roll and top squeeze roll can be removed readily and the samples can then be run with no drag or squeezing action.

The shaft of the lower squeeze roll has been extended on the end opposite the drive so that multiples of the unit can be coupled together. By rearranging the water bath piping correspondingly a single drive assembly and water pump will serve a group of units.

Suggestions have already been heard that the machine might serve many purposes where it is desired to make comparisons under identical and controlled conditions. However, its main purpose is the comparison of detergents. The committee believes that this machine will enable one to compare detergents intelligently and under identical and reproducible conditions of time, temperature, concentration and mechanical action.

It is the intention of the committee to have this unit tried out at the Lowell Textile Institute under the able direction of Dr. Stiegler. If it is found advisable to modify some features of the design, this will be done.

Ultimately, and we hope within a few weeks, when performance has resulted in approval of the final design, arrangements will be made with the Riggs and Lombard Company, who constructed this

model, whereby it can be purchased through the Research Committee.

* * *

Chairman Olney: Our next report is from the Committee on Mildew Proofing. Dr. Barker is the chairman of that committee, and we will hear from him.

* * *

MILDEW PROOFING COMMITTEE

Dr. H. D. Barker: As a great many of you know, during the war there was much interest in mildew problems and mildew proofing. I was concerned in how the interest would continue in the postwar period, and you might say that it looks as if it will be maintained. We had at our meeting on Thursday morning about 30 people who remained throughout most of the long morning and afternoon session.

At that time we considered a summary of the results of the second series of cooperative tests that have been conducted by this committee. You will probably recall that in 1943 and 1944, we ran a series of inter-laboratory tests dealing with various fungicides applied at various concentrations. As a result of those inter-laboratory tests we succeeded in eliminating a great many needless techniques and pet methods, and were able to agree on a few somewhat more standardized procedures. But since that work had dealt with samples that had been prepared very carefully in the laboratory, it was the feeling of a great many interested laboratories that before attempting to formulate a recommended procedure for the association we should conduct another series of tests on commercially treated fabrics.

The Quartermaster Corps agreed to supply us a set of such fabrics, and furthermore, agreed to make available to our committee the results of actual service test exposure in Panama and elsewhere as a check against the efficiency of our various test methods.

At the meeting on Thursday the summary of this report was considered and various revisions and corrections suggested, and it was decided that the report should be presented to the association for publication, either in the Dyestuff Reporter or in a special bulletin, as the editors of the Publication Committee see fit.

Based on these two series of cooperative tests that have involved a great many laboratories in this country and Canada, commercial laboratories and institutional laboratories, we feel we are now in a position to attempt to formulate a series of test procedures that might be recommended to this association for testing mildew proofing textiles. We circulated, prior to the meeting, a rough draft as a starting point for discussion, and at the meeting it was agreed in principle that the following should be recommended to the association: (It is proposed that we make the necessary modifications in wording and in clarity that were suggested, and then circulate these prior to the spring meeting and attempt at the spring meeting to agree on a definite program that can be presented to the association, with the hope that it might be included in the next Year Book.)

The principles of the test methods that were agreed upon were, in Section 1, to describe four specified biological tests.

1. *Chaetomium globosum*-mineral salts-agar test.
2. *Chaetomium globosum*-water-agar agar test.
3. *Aspergillus niger*-water-agar test.
4. Soil burial test.

In the second section we have testing of the performance of textiles with respect to, (a) the mildew capacity as determined by the *chaetomium globosum*-water-agar test and the *aspergillus niger*-water-agar test, with the view in these two tests where no nutrients are supplied to see whether or not the material has the capacity to grow either superficial molds, such as the *aspergillus* that requires the presence of non-cellulosic carbon, as well as whether or not they can support rot-producing organisms such as the *chaetomium* test. That would be the mildew capacity test.

The second test would be to obtain a rot-resistance rating as determined by the *chaetomium globosum*-mineral salts-agar test, where we supply all the nutrients except the carbon that must be obtained from the cellulose, and the soil burial test.

Then the third part of the textile test would deal with the permanence of rot-resistance properties, as determined by 24-hour water volatilization resistance tests; 150 degrees F. for 24 hours, wet storage for 6 weeks, and a weather resistance test of 10 weeks, from April 1 to October 1, at some one locality that might be decided upon.

In the third section we are considering the advisability of attempting some evaluation tests for certain of the mildew preventive properties of compounds that might be offered to the textile trade. This, of course, would be to gain a little basic information on the compounds that might be offered. Of course, the performance of those compounds depends on how they are applied, but in the proposed series of tests we would attempt to apply them under one specific condition to 8-ounce duck, which we hope might be stocked by the Research Committee and be made available to the laboratory. If that could be done we would then attempt to determine the minimum protective concenrtration that would be required to protect against the *chaetomium globosum* or the soil burial. Then we would attempt to determine some of the permanence ratings in exposure to dry heat and weather exposure that I mentioned for the textiles.

To aid in standardizing these tests, I think it would cut down a great deal of the variability if we could get the Research Committee to stock a standard untreated fabric that might be used as a control for outdoor weathering and for testing fungicides. We might also wish to have a portion of that fabric treated with some standard treatment that would be used for testing the comparative activity of tests and as a standard test.

The proposal was also made that in an attempt to standardize the soil burial test it would be desirable to arrange to obtain some naturally fertile soil, perhaps from the corn belt, and make arrangements with someone in that region to furnish enough soil to at least use it as a standard in determining the activity of our own composted soil, or to run official tests.

Then in connection with the weather test, it was thought that we would like to have the Research Committee designate or make arrangements for some weather exposure station that would agree to expose samples on a fee basis for official tests. We hope we will have that formulated in a definite way by the spring meeting.

* * *

Chairman Olney: The second World War brought out many points of interest to textile chemists, and many things which have been rather superficially investigated previously have been the subjects of extended research. One of these subjects is the weathering of textile materials, We have a sub-committee on that subject, of which Mr. Barnard is the chairman, and we will hear from him now.

Mr. Barnard: Those of you who were here yesterday morning heard an excellent paper by Mr. Lee, largely on weathering. I will add that I am a little bit more optimistic by nature than he is, although I realize the difficulties, and I am sure neither of us expect to be able to predict the life of a cotton fabric in New York, for instance. Still, I am sure the effect of weathering on fabric can be studied and evaluated.

* * *

COMMITTEE ON ACCELERATED AGEING OF COTTON

This is a report of a very small committee (only five members) on a very large problem namely: "Why does cotton deteriorate on ageing and how can one

predict its outdoor life from an indoor accelerated laboratory test." Successful research today is generally the result of team work. The day of the individual inventor is in the past. When better mousetraps are made, it will not be by some hermit in the woods, but by a team of experts:—Perhaps an economist to predict the future markets for better mousetraps,—an engineer to design them, — maybe a zoologist who knows the likes and dislikes of mice and finally the rather maligned business man who finances the team and manages them.

So even our small group represents a variety of viewpoints. Each man pursues his own individual problems but we get together three or four times a year to discuss how our own work fits into the larger picture as a whole and to get the advice and suggestions of the others. This also avoids duplication of effort.

Our progress to date may be summarized as follows:—Thanks to the QM's subcommittee on tropical deterioration we have been given an excellent resume of the previous literature and patents on the ageing of cellulose. Such a review is of course fundamental to any research project. Next the Bureau of Standards has studied the standardization of outdoor exposure testing so that duplicate results can be obtained:—Another fundamental if outdoor life tests and indoor accelerated tests are ever to be correlated. They have more than 1500 sample panels exposed already, mainly in a study of how various mildew preventive treatments affect the deterioration of cotton. The southern regional laboratory is also working on this same problem and has developed a unique thermal shock method of accelerated ageing which shows promise. They are now interested in carbon arc radiations—a subject which has been attacked in a fundamental way by the Naval Clothing Depot at Brooklyn. Both outdoor life and indoor storage are being studied by the QM Depot at Philadelphia. As mentioned before, each of us goes his separate way, but by cooperating and exchanging information the work of this subcommittee is advanced little by little.

I have here, thanks to Mr. Appel, some slides which illustrate some factors in the work, and I would like to show them to you now.

* * *

Chairman Olney: Probably no sub-committee of ours has undertaken a more extensive job than that of the Wash Fastness Committee. They have already been working on an entirely new schedule for about two years. They have not completed their work yet. Mr. Dorn is the chairman of that committee, and he will report to us now.

* * *

WASH FASTNESS COMMITTEE

Charles W. Dorn: The Wash Fastness Committee can only give a report of progress. We sent some 42 samples of cotton goods to a number of laundries throughout the country to be washed from one to 30 times. The samples were sent to 22 laundries and to date we have received samples back from 12 of the 22. The entire lot of washings were completed, and one laundry has returned a partially completed batch. Besides the laundries, there were nine sets of samples sent out to various laboratories to be washed under home methods and in the Launderometer. Those samples are all back. To date we have received 27,600 samples back from this test. We have a wide variance in what we obtained from various laundries throughout the country. Our work to date has shown fairly well that our wash fastness tests do not compare with what actually happens in ordinary every-day use.

Now, the cotton phase of this study represents only a part of it. There is another study going on in the Piedmont Section where hosiery washability is being studied very carefully.

The rayon group has obtained some 15 lots of cloth which has been cut up and are at present being marked to be sent out for a similar test to what we have performed on the cotton. Those samples will be sent forward to laundries within the next month.

It was decided in our committee meeting that we would also include in this rayon study mixtures of rayon and wool, and the committee also plans within the very near future to set up another subdivision which will study wool as to its washability.

For our tests we have not waited for completion of all of the samples in order to go on with our work in trying to get a more representative type of test.

The samples we have received have all been graded and we have picked out a mid point of destruction. From the various laundries that gave us the mid point, we have formulated a composite wash for the various types of materials, and we are now planning to go into a laundry and wash these samples under the composite wash procedure, from one to 30 times, to see if we meet the mid point we have found from the various test samples that have been returned. That work will start within the month.

We have also given considerable attention in our studies to the relation of the weight of the sample used in the Launderometer to the volume of liquor. Our present test method simply tells us to take a sample 2 x 4 inches, attach it to a piece of white test cloth, and wash it in a volume of liquor of 100 ml. We apparently made no provision to take care of whether the sample was one ounce per square yard or whether it was 20 ounces per square yard. In commercial practice, naturally, the weight of the material being washed has a very definite relation to the liquor volume.

We have also given some thought to chlorine in the city water supplies. Harry Jordan, secretary of the American Association of Water Works, has told us that the chlorine will run as high as five parts per million in some locations throughout the United States.

We have also done considerable work with the Atlas Electric Devices Company in trying to develop new types of jars for the Launderometer. Two jars have been submitted. They did not come soon enough so that we could do any work with them. One is a one-pint metal jar, the sides of which are corrugated. We hope with this jar to get more abrasion in our wash tests.

The other jar, a rather odd looking thing, has a one-gallon capacity. The inside of the jar is corrugated just as a washboard is corrugated. The jar will fit in the standard Launderometer, and the Launderometer will take a load of eight of these jars at one time. We hope we can find out very quickly whether these jars will give us more abrasion or not. This jar, incidentally, would be big enough so that shrinkage could be determined at the same time as fastness of color to washing is determined.

You will note in the new Year Book that the committee has definitely decided to eliminate the use of rubber balls in the Launderometer. The standard now is to use 10 ¼-inch stainless steel balls.

* * *

Chairman Olney: Another committee which was formed within the year is one on fire resistance. The original committee was for the purpose of determining resistance of materials to the action of fire, and that also has been a very important subject as far as the war was concerned. Recently the subject of flammability of textiles has come up. The original committee, of which Mr. Redmond was chairman, was amplified by another committee under the chairmanship of Dr. Hager. They have done a considerable amount of work and have devised a piece of apparatus which is exceptionally representative of what can be done to fit any particular emergency

Dr. Hager will report to us at this time.

* * *

FLAMMABILITY OF TEXTILES

Dr. Herman E. Hager: Last January 27th, the Legislature of the State of California passed a bill which banned the sale of any synthetic fabrics more highly flammable than cotton in its natural state. This vague and unenforceable law, as well as a number of frequently fatal accidents, caused such a stir in the rayon trade that NRDGA asked A.A.T.C.C. to devise a test method for evaluation of fabric flammability. Dr. Olney, appointed me to form a committee which met for the first time last March and which developed after many alterations a testing apparatus built by U. S. Testing Company which is completely automatic, eliminating therefore all possible human errors.

Meanwhile, the matter of flammable fabrics was tragically brought to the attention of Congress when in April three boys were burned to death in Washington after their cowboy suits caught fire. Legislative action was demanded. Some of our committee members went to Washington to demonstrate our machine and to make it clear to members of the Interstate Commerce Committee that an enforceable law depends on a reliable test method. In May, Dr. Bonnet of our committee went to California and demonstrated successfully that cotton is just as flammable as rayon and that fabric flammability depends rather on fabric construction than on any specific cellulosic fiber. The California law was then correspondingly amended.

Our committee meanwhile arduously continued their research. The machine had been proven to meet its requirement. Six more were constructed and farmed out to six testing laboratories, where a series of tests on eleven selected, critical fabrics was conducted. It was then found that correlation of results was not obtained. This was traced in scores of trials; first, to varying humidity which causes different moisture absorption in different locations and, second, to surface unevenness of the test samples. Both errors were eliminated, the first by drying the test samples to constant weight and cooling them in a dessicator before testing and the second by brushing them before drying and again, just before testing, with a specially devised revolving pile-restorer. By following such specific procedure it has very recently become possible to obtain the desired correlated results.

Our next object will be to test numerous fabrics in different locations, according to our new method, and set up if possible a borderline standard fabric, which will allow differentiation between dangerous and nonhazardous materials.

I will ask Mr. Baker to demonstrate the machine to you.

Mr. Baker: I just want to point out to those of you who are not familiar with this apparatus, which is described as a Flammability Tester, some of the features we built into it in order to eliminate the human element. Starting at the fuel supply, we are using CP butane in place of city gas supplies, which fluctuate both in heating capacity and pressure. Therefore we have a standard supply of fuel with a very fine control valve operating through a manometer to give a standard flow of gas.

In the chamber itself we have a gas nozzle operated mechanically to give us a one-second throw of the flame on to the sample face. The flame will penetrate about half its length into the material being tested. From there we have a measuring device; that is, a means of measuring a rate of burning up a 45-degree incline. That takes into consideration the five-and-one-half-inch length sample and measures the time from the point at which the flame impinges until a stop cord at the top burns through to close automatically the timing mechanism.

I am going to illustrate with three samples, in this order: One is cotton sheeting through which we standardized the flame. That is, we do not want the flame intense enough to ignite cotton sheeting. We do, however, set the flame high enough so that it scorches the sheeting. ing. From this we have a measure of our temperature for the one-second interval. The second sample will be a brushed-knit which is not hazardous. This is a very popular low pile brushed fabric of similar fiber content to a third sample I will illustrate, which is a long pile and burns very easily, or readily. In fact, the third sample is one which is very similar to that used in the cowboy chaps that were mentioned.

(Demonstration). The first sample, the cotton sheeting, is slightly scorched. The second sample burned off in about nine seconds. The third sample, a high-pile viscose fabric, is a very dangerous fabric. You perhaps noticed how rapidly the flame sprang to the surface, and it burned up in less than the timed motion, or less than one second.

These specimens give you a good conception of the differences in the flammability of fabrics.

* * *

Chairman Olney: Mr. Redmond is here, the chairman of that branch of the committee on fire resistance. He will give us a report.

* * *

COMMITTEE ON FIRE RESISTANCE

Mr. James R. Redmond: Before submitting my report, I would like to give you a differentiation between the committee on testing fire resistant materials and Dr. Hager's committee on flammability. As you have just seen, Dr. Hager's committee on flammability is endeavoring to develop a test method which will distinguish between dangerous and nondangerous consumer textiles. Emphasis has been placed on wearing apparel. On the other hand, the committee on testing fire resistant materials is concerned with a test method for fabrics which have been designed or treated to be resistant to fire. However, we too, as you shall see later, are called upon to comment on the danger factors of various textiles which do not resist flame.

The membership of the present committee on testing fire resistant materials met for the first time at the Atlantic City meeting in late 1944. During 1945 we improved the testing equipment which has been used on millions of yards of military fire resistant textiles. We discovered a variable which apparently had been overlooked and was not under control. This variable is the type of hood and air circulation in which the fire resistant material being tested is suspended for the charring period. As you know, in our test the specimen is exposed to a burner flame for 12 seconds. An observation of after-flaming is reported in seconds. We require that the fabric shall not after-flame more than two seconds, and there is not any particular trouble in meeting that requirement in the industry.

While the flame goes out very quickly, a second element of fire which is described as after-glow or charring or flameless combustion is of importance and must be measured. We must have controlled conditions during the charring period, and we expect to accomplish this during 1946. The Quartermaster Corps is providing our committee with special fabrics for testing and correlation, and these fabrics should be ready within the next 30 days.

The next matter of importance before our committee concerns a new series of regulations which have been enacted by the California State Legislature, in connection with fire resistance of tents and awnings.

On the 15th of September, 1945, the California State Fire Marshal adopted regulations in accordance with Chapter 1, part 2, division 12, and so forth, of the Health and Safety Code, which pro-

vides as follows: "The State Fire Marshal is hereby authorized and directed to prepare and adopt rules and regulations establishing minimum standards for the prevention of fire and panic in connection with the use of tents, awnings or other fabric enclosures."

Now, for those of you who are interested, I would like to give you the name of the Fire Marshal in California, and if you care to write for a copy of that bill you may do so. The name is J. R. Yockers, State Fire Marshal, 995 Market St., San Francisco, California.

We have been brought into this matter by the National Association of Canvas Goods Manufacturers, who are quite concerned. We had at our meeting Thursday morning Mr. Adams who is general counsel for that association, and Mr. Russell, who is president of the association. Mr. Adams pointed out that the bill, which is primarily concerned with public protection against fire, embraces many other conditions, such as crock resistance, accelerated weathering resistance, breaking strength, and so forth. He also commented upon the interpretation of an outdoor public gathering which, according to the bill, includes any group of more than 10 persons, whereas the National Fire Protection Association interprets an outdoor public gathering as more than 200 persons.

Mr. Adams also stated that the National Canvas Goods Manufacturers Association favors all legislation designed to protect the public as long as that legislation is reasonable and will not impose extreme hardship on any group of manufacturers.

Mr. Russell commented on the type of finish which would be necessary to meet the requirements of the California bill. He pointed out that an increase in weight of approximately 50 per cent would prohibit the use of such fabrics as tent and awning materials unless all rollers, ropes and so on, were changed to carry the additional weight. Also, most of the commercial tentage today is already treated with paraffin and it would be difficult to attempt to apply treatment to this fabric.

He stated that some of the members of his association in California would be out of business if they had to meet all those regulations. Incidentally, I don't think there is a light weight finish in the country today that would meet the requirements of that California bill. I say that, because there is one test requiring exposure for 400 hours in an Atlas double-burner accelerated weathering machine, and I don't think there is a light weight awning finish in the country that would pass that test.

However, the State Fire Marshal cannot be censored for taking all the information he could find, whether based on fact or experimental information, and putting it into his initial regulations.

The Canvas Goods Association has called upon our committee to render whatever technical advice may be requested. While I haven't discussed it with Professor Olney yet, we have confined our comments simply to the fact that we are working on a fire resistance test and are not concerned with the other factors. However, it is not unlikely that we will be asked to comment on these other factors, because our committee includes some of the most prominent fireproofing men in the country.

The third matter being studied by the committee concerns a group of fabrics used in aircraft interiors. We received these samples from a committee appointed by the Aircraft Manufacturers to study the hazards of textiles when exposed to flame in aircraft interiors. We noted that some of the wool and mohair pile fabrics have rubber backing and once ignited these materials seem to burn very persistently and with a hot flame. Also, there is a cushion pad material which apparently is a mass of curled hair or similar fiber coated with rubber. It makes an excellent cushion material, but once ignited it burns violently. I have a sample of that here and I would like to ignite it for you, to show you how dangerous it is.

. . . Demonstration was given. . .

Mr. Redmond: The committee is going to forward its comments to the aircraft committee and suggest they conduct research on that material and reduce the hazard. We are offering our cooperation in the testing of it.

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Chairman Olney: Our next report will be from the committee on color transference. They have been very active during the past year, and Mr. Knowland will report for them.

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COMMITTEE ON COLOR TRANSFERENCE

Daniel P. Knowland: A little more than a year ago at our annual meeting in Atlantic City the matter of color transference was rejuvenated and this new committee started to function. We have in this year perfected a chart which your committee believes will enable anyone with a little experience to judge visually, and rate sensibly, the amount of color that has transferred from one colored material to another uncolored material.

This subject has been discussed at our sub-committee meetings most thoroughly during the year as well as before the Research Committee as a whole. Such proceedings may be found in the AMERICAN DYESTUFF REPORTER:

April 3, Vol. 34, No. 9, Page 166.
October 22, Vol. 34, No. 22, Page 426.
December 3, Vol. 34, No. 25, Page 500.

In the first report we made comparisons of the new method when applied to crocking tests against the older method in which three dyed standards were used. In the last article (December 3 issue of the DYESTUFF REPORTER, page 500) written by Mr. Holst, our secretary, he describes our chart and suggest methods of application.

As we have stated before and must repeat at this time we as a committee have finished our task; the chart is before you and is on sale by the A.A.T.C.C. We as a committee are ready and only too glad to cooperate with other committees that have color transference to contend with in the fastness tests with which they are concerned.

This new tool that you have in your possession has greater possibilities of usefulness than may at first be observed and when one becomes familiar with its use in rating small color differences, the chart will be found extremely useful in settling many questions of relative fastness involving transference of color.

In evaluating fastness tests which involve the migration or transference of color from a sample to an undyed test material, this chart will be found valuable in rating precisely the degree of this usually undesirable effect, eliminating the necessity of preparing or securing colored standards for comparative trials. This staining of undyed material is of primary importance in crocking tests, and also must be considered in many other tests, such as perspiration, washing, water, and steaming.

Rating is accomplished after carrying out the usual standard testing procedure, by simple visual comparisons of the stained test fabric with the chart, which consists of a selection of Munsell color chips conveniently mounted on a perforated card to facilitate handling. The 24 chips, in neutral gray and five hues, are arranged in four rows gradated in intensity from a very pale tint in Row 4 to a fairly heavy depth in Row 1, at the bottom. The stained material, viewed through the circular holes in the card, may be moved until it is adjacent to the color chips closest to it in hue and intensity, and its numerical rating is then obtained by reference to the numbers assigned to the rows, interpolating when found necessary. A mask is provided to assist in the final rating by concealing possibly confusing color chips of unrelated hue, exposing to view only the material being tested between two color chips varying only in depth. No row of

standard chips is necessary for a rating of 5, as this rating will apply to cases showing practically no staining or transference.

Translation of these numerical ratings in terms of degree of excellence or acceptability will vary according to commercial or trade standards for the specific test under consideration, and will evolve as the chart is put into use by testing laboratories.

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Chairman Olney: Another subject which has been of great importance during the war is that of water resistance. This committee is under the chairmanship of Mr. Slowinske, who has done a large amount of work.

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COMMITTEE ON WATER RESISTANCE

George Slowinske: The Water Resistance Committee met twice during 1945, and met again last Thursday. A report of the two 1945 meetings was published in the September 24, 1945, issue of the AMERICAN DYESTUFF REPORTER. It was prepared by the committee's secretary, Alton Cook. A report of Thursday's meeting is being prepared by Mr. Cook and will appear in a future issue of the REPORTER. The 1945 Year Book of this Association contains photographs and detailed drawings of the committee's instruments, along with detailed procedures for operating the instruments.

The instruments also are shown in one of the exhibit rooms. Behind the equipment exhibit is a display of water resistant or water repellent fabrics of the types which can be tested by means of the instruments. In this connection, I want to express my particular thanks to one New York City member of the committee who aided me in preparing the exhibits, Hector Borghetty.

The instruments shown or illustrated on the exhibit table are:

1. An official standard Spray Tester, including a rating chart for use with the instrument.

2. A tentative standard Immersion Tester.

3. A tentative standard Impact Penetration Tester.

4. An official standard Hydrostatic Pressure Tester, along with an alternate or optional Suter Hydrostatic Pressure Tester.

The Water Resistance Committee as a whole believes that many problems have been solved. But it also believes that its work is not yet finished. In fact, during last Thursday's meeting it became apparent that the unsolved problems are going to be tougher than those which have been solved.

For example, I have often been asked why the committee has not been able to decide on one tester since it has only one main problem—the evaluation of water resistant fabrics. The answer is that the committee found out years ago that any attempt to agree on one single tester was futile, if not foolish. It is true that the committee has only one main problem, the evaluation of water resistant fabrics. However, that one problem is so complex, or has so many angles, that one method of attack could never solve it. I know that the Office of the Quartermaster General and the Philadelphia and Jeffersonville Army Quartermaster Depots will agree with the committee. Incidentally, the Philadelphia and Jeffersonville Depots have active members on the committee. Also, various members of the committee in addition to myself have cooperated with the Office of the Quartermaster General on water resistance problems.

Now, coming back to the complexity of our problem, it might be said that a water resistant fabric is like a dyed fabric; both have many different related and unrelated characteristics. For that reason spray, immersion or absorption, impact penetration and hydrostatic pressure penetration tests are required to measure different properties of a water resistant fabric in the same way that light, washing, dry cleaning, crocking, gas fume fading, etc., tests are necessary to completely evaluate a dyed textile.

However, the committee's study did show that the complex problem could be simplified a little. It was found that test methods for water resistant fabrics could be divided into two main classes. They are, (1) tests which measure resistance to wetting of the fabric itself; (2) tests which measure resistance to penetration of water or rain through the fabric.

Two of the testers shown in the exhibit room measure the first property and two measure the second property. The two which measure the first property are the Spray and Immersion Testers. And they do a pretty good job of it. They have been found very satisfactory in evaluating the effectiveness of different water repellent treating agents. The simple Spray Test, for example, is widely used by finishing mills to control the quality of their finishes from day to day. It has gained recognition in England. It was also widely used during the war by the Army and Navy, and its use is specified in many specifications. Other tests which measure the same property as the Spray and Immersion Tests are under consideration by the committee, the most important of which is the Dynamic Absorption Test of the Army.

The Impact Penetration Test and the Hydrostatic Pressure Test measure the second property I mentioned, resistance to water penetration through a fabric. But —and this is a big but—the committee is not satisfied that they adequately measure this property. They can be used to rate different fabrics for relative rain resistance, but they cannot yet be used to predict how much rain will go through a particular fabric or garment. Mr. Hahn of the N.R.D.G.A., who addressed us at the dinner meeting on Thursday evening, might say that they do not give results which are understandable by the consuming public.

For that reason the committee's meeting on Thursday was concerned mainly with consideration of new rain penetration testers. The committee believes that it has accomplished a great deal in aiding the chemical industry and the textile finishing mills to evaluate water repellent treating agents and fabric treatments. It also believes that a judicious use of its four testers will help in selecting or developing improved rainwear fabrics. But it is far from satisfied with its progress in developing information or test data which can be used to predict whether or not a particular fabric will keep the wearer dry in a rain of a particular intensity or duration. In fact, at the Thursday meeting, I, as chairman, was delegated to pose a problem to the Executive Committee on Research and the Research Committee. The problem is this: The water resistance committee has under consideration seven different water penetration testers. They are:

1. The committee's official standard Hydrostatic Pressure Tester and the Suter optional instrument.

2. The committee's tentative standard Impact Penetration Tester.

3. A drop penetration tester developed by Drs. Harris and Sookne and modified by the Army.

4. A wind and rain tester developed by Mr. Neiman of the Sea Island Mills.

5. A penetration tester developed at the Lowell Textile Institute under Mr. Ryberg.

6. The Bundesmann Tester, developed and used in Europe.

7. A rain tester developed by the Fine Chemical Division of the duPont Company.

All seven of the testers have merit. All seven of them subject the fabric to drops or sprays of water. At the January 11 meeting of last year, the committee agreed that they represented a type of instrument which was much more closely related to rain penetration than a hydrostatic pressure test. However, the committee has not yet found a way to compare the seven testers, one against the other. No

one member of the committee, for instance, is in a position to tackle such a problem. Consequently, it was decided to approach the Research Committee. It is possible that such a comparison could be carried out at the Lowell Textile Institute under the guidance of the A.A.T.C.C.

In closing I wish to state, as a member of the water resistance committee, that one of the testers, the duPont Rain Tester, will be subjected to further study. The results will be offered to the Water Resistance Committee for consideration. The program involving the duPont Rain Tester is this: Approximately a dozen different rainwear fabrics are being collected from various points in the trade. Each fabric will be in the grey and over 100 yards in length. The fabrics will be prepared and treated with a single water repellent at a textile mill. A single style of raincoat will be made using the treated fabrics. Both single and double thickness garments will be made. The garments then will be tested during actual exposure to natural rain or to simulated rains in the rain room of the Philadelphia Quartermaster Depot. It is hoped that a relative ranking of the raincoats will be obtained. The fabrics going into the garments will be subjected to the Rain Tester instrument in the laboratory. The results obtained should furnish information concerning correlation or lack of correlation between actual or simulated rain and the laboratory Rain Tester instrument.

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Chairman Olney: The next committee to be heard from is the committee on color fastness to light. I am very sorry to report that Mr. Seibert, the chairman of that committee, has been taken ill and is not able to be here this morning. But Mr. Christison, who has been an active member of that committee for 25 years, will be glad to give us a brief report for Mr. Seibert.

* * *

FASTNESS TO LIGHT

Hugh Christison: Yesterday we submitted to the Bureau of Standards, and will eventually to the Federal Trade Commission, a recommendation that they take these measurements of the fading of the standards and go on record as stating that these represent what you should expect from 10, 20, 40, 80 and 160-hour exposures. These tests are made on standard cloth consisting of the one dyeing that fades and one that does not. There is somewhat of a disagreement in the committee. The majority feel that we should have a standard lamp, if possible, but there are some variables with the lamp that to me make it seem impossible. You would have to control the heat, the moisture, the distance of the samples to the lamp, the carbons, the voltage and amperage and some other factors. Personally I believe that we will have to take the standards rather than the lamp.

The majority point of view is that the trade expects and wants to go on a basis of reporting on Fadeometer hours. It is thought that the trade wants it. The minority believe that we should report that the goods are represented by the standards 1, 2, 3, 4, 5, 6, or 7.

Mr. Seibert and the Bureau of Standards have done work along the lines of providing a means of calibrating the lamp, and in their opinion the best way of calibrating the lamp is to use dyed paper. The dyed paper apparently has some distinct advantages. The surface of the paper is such that probably smaller differences can be seen that are observable on cloth. The paper is much cheaper, and therefore can be used more freely. Their idea is that in making the light tests, each time a light test is made a piece of paper shall be exposed simultaneously, and if in 19 hours the paper gives the 20-hour test, then the samples shall be accredited with a 20-hour resistance. Or if the paper indicates a 20-hour effect in 15 hours or 24 hours or anything else, the corresponding accredit shall be marked against the sample being tested.

I don't think there is much more that can be said. I think that most of us believe that if there is only one test to be made as regards the public, the light test probably would be the most important.

I would like to have Mr. Appel describe the paper as he is far more conversant with it than I.

First, though, these tests Mr. Seibert has recommeded for promulgation will be the averages of the results on these blue samples from 15 laboratories, representing quite a variety of machines. There are three types of machines including the direct and alternating current.

Mr. Appel: I want to start in again and re-orient you on this subject.

There are very many ways to get at the light fastness business. The way that we have all used for years is by direct comparison of the fastness of the unknown with known materials. That method of doing things has everything to recommend it. It takes care of all of these variables in light fastness testing that are so hard to control, in the laboratory or in sunlight. Sunlight and sun exposures do not give duplicable results from day to day or week to week. We have to have some means, then, of making comparisons. The new standards are far better than the standards of the previous sets of standard dyeings. I think they will be used for many years. They take care of all the factors and variables in Fadeometer testing, and also in sun testing.

However, there are those in the industry who insist in talking about lamp hours and not about meeting some one of these eight standards. That being the case, the committee and we at the Bureau felt that something had to be done. There are two things that we are attempting to do at the Bureau of Standards. In the first place we have felt the need for at least one lamp in the country where you could go back at any time and get the same results that you get today. We need a lamp where we have control of all these factors, where we have not only measuring devices on the current and the temperature and the humidity, and so on, the various factors that go into the test, but measuring devices on the radiation coming out of the lamp so that we know when we make a test that we are getting the same amount of radiation and the same spectral distribution of the radiation.

We have built such a lamp down there. It is doing very well, we think, but we haven't exhausted all of our ideas on how to improve it. We started out by running on a constant voltage line and putting it in a separate room where we controlled the temperature and humidity, and so on. But we didn't eliminate all the variations in the lamp by a good deal, even though we had carefully and specially made and selected carbons.

We then decided to not operate on a constant voltage but to take the current from a photo cell which was viewing the light at all times and amplify that and feed it back into the control mechanism, so that we operated at a constant output. We considerably improved the results.

We are now doing still another thing—first, we tried using an electronic photon-counter to evaluate the output, in order to get a numerical value. We tried that with the photocell in one place, but now the photocell revolves around the lamp and picks up the same directional variations as the samples themselves. These efforts are all in the direction of having a lamp which will do the same thing day in and day out. Perhaps in the distant future we can have all the lamps so operated; I don't know. But that is for the future and certainly not for the present. The equipment is too costly.

The other thing that is necessary is to make it possible to calibrate lamps; that is, if we are going to talk about standard fading hours or Fadeometer hours or

(Continued on Page P163)

RESEARCH COMMITTEE EXHIBIT AT THE VICTORY CONVENTION

AN exhibit which attracted many interested visitors at the Victory Convention held on January 3, 4 and 5, at the Hotel Pennsylvania, New York, was the one arranged by various sub-committees of the Research Committee. Approved and tentative test methods of the Association were illustrated by displaying testing instruments, fabrics, photos, descriptive material, samples, etc.

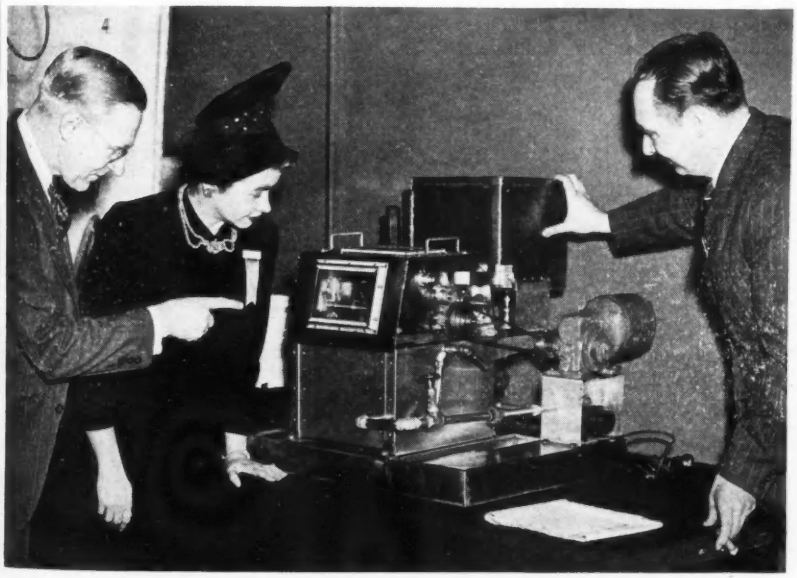
This was the first time that so much apparatus which was developed, designed or produced by the various sub-committees had been exhibited at one time. It served as a graphic illustration of the type and scope of the work which is sponsored by the A.A.T.C.C. It was not only of interest to visitors but it also afforded an opportunity for many members to examine this apparatus for the first time.

There appears on these pages a number of photographs taken during the Convention. The descriptive matter is necessarily sketchy and the reader is therefore referred to published reports of the sub-committees which have appeared in the Proceedings and the Year Book. Of interest to non-members and the newer members of the Association will be the 1945 Year Book which has now been mailed to members. Complete descriptions of all test methods and apparatus are contained in this book.

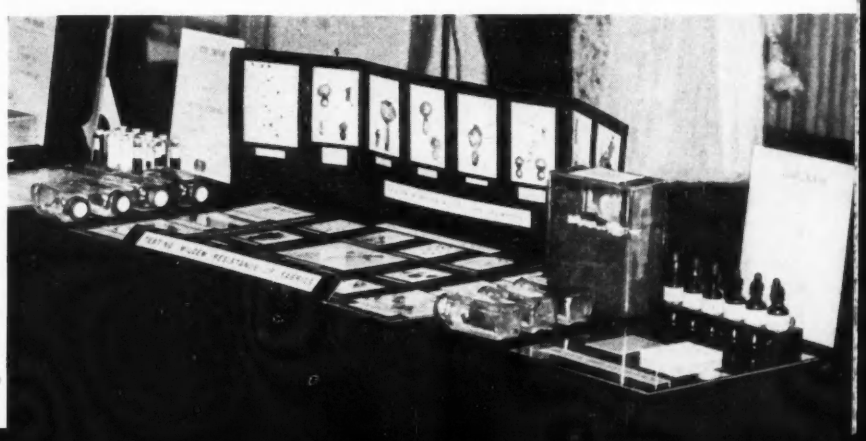
In addition to the apparatus which is shown in the photographs, the Association is also developing other test materials and equipment.

Dyed test papers have been developed for calibrating Fade-Ometer lamps with the standard lamp now being developed at the Bureau of Standards and are now under further critical tests. These papers may also be used in light fastness testing to rate samples in terms of Fade-Ometer hours rather than in terms of the standard dyed fabrics. Further investigation of the paper for this purpose is under way. Standard dyed ribbons for use in atmospheric gas fading tests have been developed for control purposes.

Cooperating with the various sub-committees in arranging this exhibit was the Exhibit Committee for the Victory Convention. This committee was composed of Dr. Herman E. Hager, chairman, Dr. W. E. Coughlin, Ruth Corby and Margaret Hayden Rorke.



←Inspecting a detergency machine, which was exhibited by the Detergency Committee. This trial machine was manufactured by Riggs & Lombard, Inc. for the committee. The machine may be used in the following studies: (1) Types of soil on which detergents must act; (2) Comparative evaluation of detergents and their performance; (3) Mechanical means for conducting detergency tests.

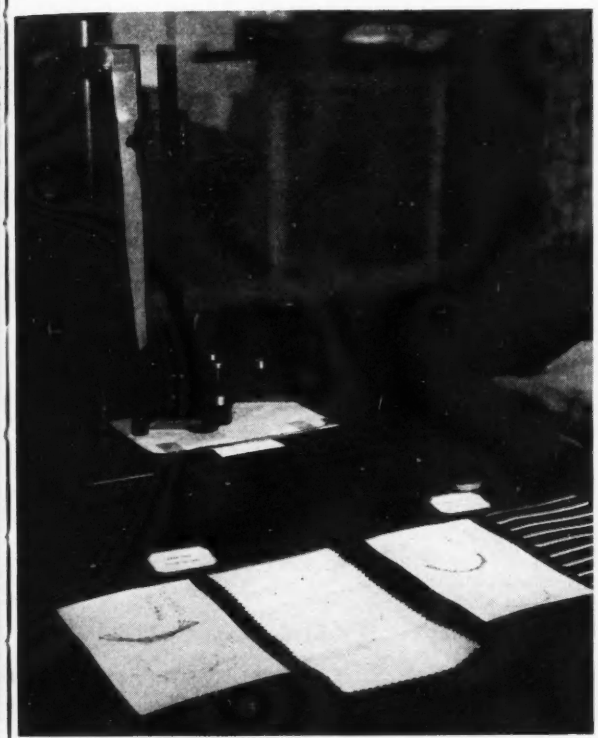


The exhibit of the Mildew Resistance→ Committee attracted many visitors. The purpose of the test method developed by this committee is to determine the fungicidal or fungistatic effectiveness of preventive compounds, and to determine the mildew capacity, rot resistance and permanence of such properties.

←*The operation of the immersion tester is shown in this photo. Four methods of testing various properties of water-resistant on water-repellent fabrics have been developed by this committee. They are (apparatus shown left to right in photo): (1) Official Standard Spray Tester; (2) Tentative Standard Impact Penetration Tester; (3) Tentative Standard Immersion Tester; (4) Tentative Standard Hydrostatic Pressure Tester (or alternate Suter Tester).*

↓*Lady members look over the display prepared by the Committee on Dimensional Changes of Textile Fabrics. The machine is experimental and an attempt is being made to duplicate the dimensional changes that a fabric will undergo while in the hands of consumers. A tentative test procedure has been drawn up but additional tests will have to be made before release.*

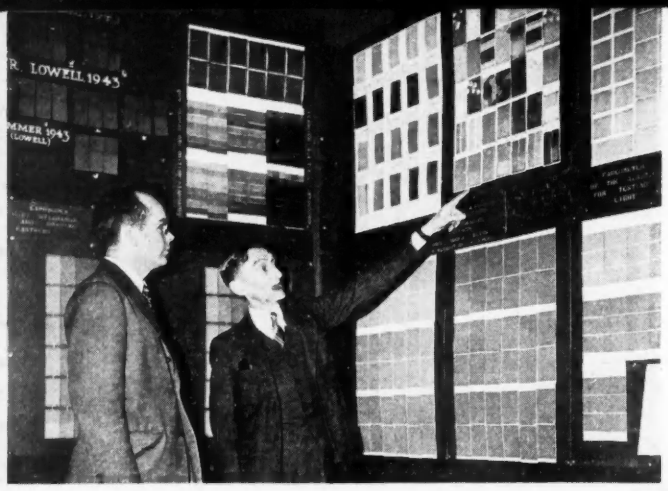
↓*A demonstration of the Fire Resistance Tester for industrial fabrics. The completely automatic machine—developed by the committee and built by U. S. Testing Company—permits measuring the time in which a flame travels over th esurface of a fabric sample. By following specified procedure it is possible to evaluate the relative flammability of different fabrics. A photo of the Flammability Tester appeared on page P23 of the January 14th issue.*



▲*The Drapemeter, which was developed with A.A.T.C.C. funds at Massachusetts Institute of Technology. By means of this machine the curved contours of a draped piece of cloth are plotted at different levels down the length of the sample. By measuring either the chord or radius of plotted curves taken at top and bottom of the sample, a numerical measure of how the cloth drapes may be obtained.*

▲*Two committee members in front of the Wash Fastness Committee's exhibit. The object of present studies of this Committee is to develop laboratory test methods that more nearly duplicate commercial results. More than 25,000 test samples will eventually be laundered. Some of the samples are displayed and new types of gallon and pint metal jars for the Launder-Ometer which are now being studied are also shown.*

Inspecting the exhibit which was prepared by the Committee on Resistance to Insect Pests. This committee has developed test methods for the evaluation of fabric pest deterrents. In estimating damage, use is made of the Visualometer which consists of a metal frame with an opening strung with fiber thread so that each square in the frame is equivalent to 1% on one square inch surface. A life cycle incubation test is being evaluated as a final criteria on the efficiency of a moth resistant compound. A quarter-size Life Cycle Cabinet is shown in the photo.



←Some of the features of the exhibit of the Committee on Fastness to Light are being pointed out in this photo. Recent work of his committee includes the development of new standards for use in testing and grading light fastness and investigation of means for the calibration of carbon arc lamps.

At the exhibit of the Committee on Transference of Color, the→ operation of the Crock-Meter is being demonstrated in this photo. This committee has recently developed a chart for measuring transference of color. In evaluating fastness tests which involve the migration or transference of color from a sample to an undyed test material, this chart will be found valuable in rating precisely the degree of this usually undesirable effect, eliminating the necessity of preparing or securing colored standards for comparative trials. This staining of undyed material is of primary importance in crocking tests, and also must be considered in many other tests such as perspiration, washing, water and steaming.

←Two interested spectators at the convention inspect a gas fading unit on display at the exhibit of the Committee on Atmospheric Fading. The purpose of this exhibit was to show the proper procedure for testing the resistance of dyed cellulose acetate rayon to atmospheric fumes. Part of the exhibit displayed fabrics which had not been properly controlled and accordingly showed the typical extreme change of shade after slight aging. Other fabrics were exhibited which withstood several standard A.A.T.C.C. atmospheric fading tests before they tended to change shade. The apparatus on the right is another type of gas fading unit.

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* Presente
December 1

PLANS FOR GEORGIA TECH TEXTILE SCHOOL*

HERMAN A. DICKERT
Director, A. French Textile School

INTRODUCTION

I HAVE been asked to talk to you this evening about our plans for the Textile School at Georgia Tech. I am coming into this work with a point of view that may be a little different from that of most educators in that all of my previous experience has been in industrial work. In making our plans, I am trying to think in terms of what is desired of a textile trained man, based on my own experience and the reaction obtained from a large number of mills with which I have been in contact in the past. With this in mind, we are making our plans from a long range point of view.

There is no question but that we will find some of our plans will have to be altered as we progress, and this is as it should be. In order to keep up with the trends of the times, it will be necessary at intervals to revise current courses and probably introduce new courses. We expect to do this as our experience shows us that changes should be made, or as new textile developments are brought to the front by research and other means.

Georgia Tech, in the past, has turned out a large number of very successful textile men. Their records are outstanding in anybody's town. We propose to continue developing men of high caliber, and we also propose to keep up with the times, as far as the education that we expect to give our men is concerned. In other words, *we have every intention of making Georgia Tech "Tops" as a Textile School.*

During the war, the number of students has been sharply reduced in all textile schools. Our present number is very low, and with the exception of a few men who were unable to complete their textile courses prior to entering the Armed Services, we cannot expect to enlarge our textile schools from returning Veterans. While in the Armed Forces, a number of men received intensive training in various phases of engineering, chemistry, etc., but comparatively few men received specialized training in textile work. In the majority of instances, I believe most of the textile work was in the Quartermaster Department where a large part of the personnel was made up of experienced textile men. This means that in order to build up our textile schools, we must start from scratch and expect to draw our students from the high schools throughout the country and not depend upon returning Veterans. We will find a few Veterans who want to enter the textile schools but I believe that in most instances, particularly for the four year classes, the Veterans will be completing "unfinished business." Others may be ex-mill workers wanting so-called short courses or possibly night or correspondence courses.

* Presented at meeting, Southeastern Section, December 15, 1945.

AIMS OF THE TEXTILE SCHOOL

We believe that it is the duty of Georgia Tech to train men thoroughly, not only in the fundamentals of textiles but also in the fundamentals of Engineering and Chemistry, in order to be able to supply the textile and related industries with suitable material from which they may select their future supervisors, administrators, and executives. It is our purpose to give every student the advantage of the best training and advice possible in the textile field. In order to do that, we must supply not only the best in facilities, but our professors must make every effort to get across to the students the fundamentals of textile work and keep abreast of all modern trends in the textile industry.

I am aware of the fact that most mills would be very happy if the textile schools could graduate *experienced men.* Of course this is impossible. The best that any school can do is to impart to the student the fundamental knowledge of his field in such a manner that he is able to utilize and build up on these fundamentals, when he enters industry. I feel strongly that in addition to a student's academic point of view, the faculty should be in a position to instill a practical point of view as well. This will make it much easier for the college graduate to accept the rather sudden change when entering industry, and will make it easier for the industry to develop the man along practical lines.

In teaching our students the fundamentals of textiles and related subjects, we want to get across the "why" as well as the "how" to work. We want to use our mill as a laboratory, in order to get across to the student the basic knowledge connected with operating the machines. While he will have a good knowledge of how to operate them, we do not propose to spend all our time trying to turn out operators who can go into a mill and make top wages immediately as spinners, weavers, or what have you, on an efficiency basis. The mills can take our men and make them into more efficient machine operators in a few months than we can in four years. We believe that if we can get across the things mentioned, you will be able to develop a good operating man in the shortest possible time.

TEXTILE EDUCATION FOUNDATION

You are aware that the Textile Education Foundation, Inc. of Georgia has determined to make it possible for our school to develop good men. The Foundation is a non-profit organization to which almost 100 per cent of the manufacturers of the State of Georgia have contributed more than $500,000.00. It was established for the purpose of making possible the development of textile education, in order to insure a supply, to the textile industry of the South, of better trained graduates who will be qualified to assume positions of responsibility in the industry. It is up to Georgia Tech to develop such men.

In the short time that I have been connected with Georgia Tech, the Foundation has backed up our plans in an effective manner. The money set aside by the Foundation is to be used strictly for educational purposes and is not to be expended for buildings or equipment.

PROPOSED TEXTILE CURRICULUM

Concerning the needs and plans of our Textile School, we are thinking in terms of a long range point of view. All of us in the textile faculty at Georgia Tech feel that our present curriculum can be revised and strengthened and we are currently working toward this objective. Since the courses for 1945-46 had already been established and approved, nothing can be done in the way of making changes at this time. The present plans are for Georgia Tech to change from the semester basis to the quarterly basis in the 1946-47 session. This, we believe, will give us the desired opportunity to begin our work on

revising and balancing our courses more as we would like to have them. In the past, most of the textile courses in this section have dealt with cotton and other natural fibers, with a comparatively small amount of work on synthetic yarns. Most of our present textile equipment at Georgia Tech was set up a number of years ago with the idea of processing natural fibers. Over the past several years, synthetics have come to the front more than ever before. I do not believe that as many mills in Georgia have been processing synthetics as in some of the other States, but at the present time there is a definite trend in this direction and I am confident that more and more mills will process synthetics either in 100 per cent form or in blends with cotton, wool, or other fibers. Synthetics have made considerable progress in the field of dress goods, suitings, knit fabrics, etc. Because of the recent developments during the war years, there is a very excellent possibility that they will intrude into fields in which cotton previously has been used almost exclusively. With these thoughts in mind, it is our belief that more stress should be placed on synthetics at Georgia Tech. We have no intention of attempting to teach students how to *manufacture* synthetics but we do believe that they should be taught sufficient chemistry and related subjects in order that we may get across, in textile courses, the fundamentals of synthetic yarns along with the natural fibers in order that they may have a better understanding of these new textiles which in turn will place our graduates in a better position to handle these fibers in a textile mill. To begin with, we do not propose at this time to offer a synthetic yarn option, but we want to stress these fibers more and teach the students something of the background and the technique of handling these fibers, to parallel our work with natural fibers. This will give us an opportunity to build up our courses and lectures along this line, determine how well such work will be accepted by the students and the manufacturers and, eventually, put us in a position to offer a course in textile fibers, should it be justifiable.

At the present time, we are offering three options in textiles:

1. Textile Engineering
2. Textile Chemistry and Dyeing
3. Textile Manufacturing

In making our proposals for the content of these courses for the coming year, we are working on the basis that a *Textile Engineer* is a man thoroughly grounded in the fundamentals of engineering with a sound basic training in textiles. This type of course should appeal to the man who wants to enter the textile field with an engineering approach. A man trained in this branch should be equipped to enter textile operations or equipped to enter the related engineering branches of textile industry where a sound engineering background combined with textile training is essential.

The *Textile Chemistry and Dyeing* option should appeal to the man interested in textile chemical research or one who expects to center his activities in commercial Bleaching, Dyeing, or Finishing plants. A man with this background would be well equipped to enter the synthetic yarn field or would be equipped to enter the field of textile specialties, either in the manufacturing, sales, or research departments. This student will receive sound chemical training with a sound basic training in textiles.

The *Textile Manufacturing* option is designed for the man who expects to deal entirely with textile manufacturing. While it is the nearest approach to the vocational type of work sometimes given in textile schools, the course as we are proposing it definitely *is not* a vocational course but a well rounded course for this type of work. Any student selecting it for a "snap" course certainly will get a surprise!

Most of you men, as chemists, probably are more interested in our Chemistry and Dyeing option. In all options, we expect to give the same basic course in the Freshman year, which will involve Inorganic Chemistry, Engineering Drawing, Engineering Mathematics, etc. With the change to the quarterly system, we are proposing that Qualitative Analysis be given in the Freshman year. Quantitative Analysis, along with Mathematics, Physics, English, etc., should be given in the Sophomore year. We are proposing to start our first courses of textiles in the Sophomore year. We are proposing Organic Chemistry and Physical Chemistry in the Junior year along with further courses of textiles. The Seniors will take Industrial Chemistry, Textile Chemistry and Dyeing, Testing work on synthetic fibers, etc. This does not give you the entire course content but I am merely pointing out these items to indicate that we are trying to get a good background in chemistry, along with the textiles.

These proposals are now being studied by the college authorities to determine how they can best be worked in.

As you know, no textile courses in any of the textile schools are accredited by the official accrediting association. We are planning to develop our courses in such a manner that at least one option, and possibly two, may be accredited. This involves a lot of red tape, planning, and changes, but we are working to this end.

In considering our plans, we feel that now is the time to lay our basic groundwork while the number of students in the textile department is comparatively small. For this reason, we are not attempting to work in short courses, night school courses, etc. at this time. As we develop our work and the need is indicated, we can give consideration to these points; but I feel that we must get our "house in order" before we go into this phase of the work. I also feel that too many "options" for study may make the job unwieldy. I prefer turning out well rounded students in the options that we have at present as I believe that men trained in this manner can do an excellent job in the industry.

PLANS FOR PROFESSORS

While we have been talking at some length about plans for students, I think that we should give some thought to plans for professors. In the light of our proposed curriculum for the quarterly system, all professors are preparing to revise and re-write lecture notes in order to do more thoroughly the job that we have in mind. Frequently professors, while excellently trained for teaching, do not have the opportunity to keep in close contact with industry and its requirements over a period of years. In order to be able to project the practical point of view into their teaching, it is my feeling that professors should maintain as close contact with industry as possible. We are now working on plans whereby we will be able to place at least one professor each year into a representative textile mill in this state. The purpose of this is to give him a thorough refresher course in textiles and to give him an opportunity to come in contact with labor and some of their problems as well as the problems of management. It will give him an opportunity to work through the mills and obtain the most up-to-date information on the processing of fibers and the performance of new equipment. I hope to be able to place them in different representative mills over the state and naturally this is going to require close cooperation on the part of the mills. Such experience will be invaluable to the man and to our Textile School. This in turn will be reflected in our graduates going out to the mills, and will place us in a better position to know what *you* need developed in our textile students.

POINTS TO GET ACROSS TO STUDENTS

We have spoken about our curriculum for the Textile School. In my opinion there are other things to get across to our students. A criticism which has been made from time to time, is that the schools

teach their graduates that they are capable of holding down "top-notch" jobs as soon as they have graduated. This attitude makes it hard both on the man and on the mills when he accepts his first job and finds that it is necessary for him to begin at the bottom and to be advanced on the basis of ability. I recently have written a letter to our textile students in which I tried to get across my thoughts on this subject. A leading Southern Textile Journal made a survey of representative mill executives some time ago to determine what their requirements were for textile graduates. In reading through their answers to a number of questions, the following points appear to be stressed by a majority of the mills, approximately in the following order of importance:

1. Character
2. Personality
3. Ability to handle men
4. Initiative
5. Ability to put theory into practice
6. Technical training

The stress seemed to be centered on *Character* and *Personality*. If we, as a school can get these points across to our students, we will have gone a long way toward giving them the foundation for a *real* education. Sometimes a student who has finished his four year college course feels a little "proud" and a little "cockey" over his accomplishments and may feel that he has a very distinct advantage over the man who has not had the benefit of college training. This is the type of man who frequently is responsible for the criticism mentioned a few minutes ago. There are a number of so called rules that may be given the new man to follow when he approaches a mill for work, but I have written down ten common sense rules which I believe will help if we can get him to take them to heart. I would like to pass these on to you for what they are worth in order that you may see what we are trying to get across to the students over and above their fundamental education. They are as follows:

1. When appearing for an interview, dress neatly, answer questions intelligently but do not dominate the interview. Do not attempt to tell your prospective employer how to run his business or impress him with "how smart you are." He can size you up very well and determine how much you *don't know*, after five minutes of intelligent conversation.
2. If your prospective employer does not happen to be a college graduate, do not make the *fatal* mistake of assuming that you are superior just because you are fortunate enough to have college training or a college degree. This may be just as "accident of birth" on your part and your prospective employer did not reach his high position because he was dumb.
3. Remember that you are not necessarily doing your prospective employer a favor by offering him your services. He is in business for a profit and expects to obtain value received for the service he buys. It is your job to sell yourself in a manner so that both parties will benefit by and be satisfied with the transaction.
4. A pleasant personality as well as a sound technical training are your best assets when selling yourself before you have had an opportunity to obtain practical experience in your chosen field. Develop these assets to the best of your ability before approaching a man for a job.
5. On accepting your first job in a mill, forget temporarily that you are a college trained man. Do not criticize everything you may see that does not look as the "book" stated it should look. Remember that local mill conditions and requirements may demand certain practices, arrangement of equipment, machine settings, etc., to produce the best results. The mills are in business for a profit and hard experience has dictated the things you will see in order for the mill to do an efficient job at a profit.
6. Never criticize unless you are sure you have a better idea for doing a job and are capable of putting your idea into practice to demonstrate your point, if necessary. Any suggestion you are convinced is worthwhile and will add to the profit of your mill, be sure to bring to the attention of proper authorities in a diplomatic manner.
7. Your first job on entering a mill is to make friends with the operators on the machines. Obtain their confidence and respect, learn how they think and pay attention to what they have to say. While they may not have the advantage of the education you have had, they can teach you innumerable things not taught in books. Their good will and trust may well mean the difference between your success or failure in a mill organization.
8. In order to get along with mill workers, you must really like them, have *respect* for *their* knowledge and ability, be truly interested in their affairs and activities and above all, be fair and honest in your dealings with those working under your supervision as well as those of equal or better rank.
9. Be pleasant in your work. Do each job assignment pleasantly and efficiently. Do not be afraid of getting your hands dirty or to wear overalls. You must learn to crawl before you walk. The "white collar" job will come later—after you have demonstrated your ability to do the other work.
10. Consider your first few years of mill work as your "Post Graduate Textile Course." Learn all you can, apply yourself to your job and use your head. Success is bound to come!

APPRENTICESHIP PLAN

When I first came to Atlanta to take over my work at the Textile School, it was made quite clear to me by the mills that they were interested in obtaining high caliber men in the textile industry. In order to obtain "top-notch" men, *the industry must offer the necessary incentive.*

In the past, co-op students have made good records and have been well accepted by the mills. The Co-op Course has been very good but in order to become a co-op student, a man must have graduated from the upper third of his high school class. One of the main things that makes a co-op student desirable to the mills is that he receives practical training before he takes a regular job.

It is my feeling that there is a large number of high school students who do not have quite so high an academic rating but who may be more desirable as mill men because of personality, ability to get along with others and plain common sense. I feel that if these men had the same opportunity for practical experience that is given to co-op students, they could be just as desirable to the mill. With this in mind, I proposed and outlined a so-called Apprenticeship Training Program for textile students and new graduates a short time after I arrived at Tech. The outline as I submitted it covered the broad plans for such a program with the idea that it would be necessary to work with the individual mills in order to set up a detail program that would meet their requirements. The broad plan, as I outlined it, has been received favorably by the Textile Education Foundation and they are currently working with me on the details in order that the plan may be submitted to all of the mills in this state.

Briefly, the purpose of this plan is to offer an incentive to men to enter the textile industry. The plan as outlined has suggested an 18 months training course, a portion of which time could be covered by summer work which would be applied to the total time required. It fur-

ther suggests that the trainee be paid on a salary basis that would compete with other types of industry. This does not mean that we should pay the beginner as much in the Georgia towns as he could receive in N. Y., Chicago or other centers, but based on living costs, he should *net* approximately the same amount of money that he would net at those centers. I believe that this could be achieved by starting off beginners at $120.00 to $125.00 per month, after six months increase the salary $5.00 to $10.00 a month and after twelve months give him another small increase. This would set up an incentive and would not overpay the man.

I further suggested that a planned program of work be laid out in order that the student be allowed to work *completely through* a mill. This would have to be varied depending upon the type of mill and the type of student. In other words the program for a Textile Chemistry and Dyeing student should be somewhat different from the program used for Textile Engineering or Textile Manufacturing students. I do believe, however, that a Textile Chemistry and Dyeing student should spend some time in mill operations, from opening through weaving and inspection, prior to going into the bleaching, dyeing and finishing processes and the laboratory. He needs this background for a better understanding of the work which he is to do. I am quite positive that a program of this type will serve to develop better men and will offer more inducement for better men to enter the textile field. The old idea of hiring a textile graduate, giving him a broom and telling him to "sink or swim" had certain merits but frequently a new man became discouraged and quit the textile business. I am sure that the textile industry has lost a number of good men in this manner who, with a little encouragement, would have made excellent additions to the industry. Furthermore, word of this type of training has gotten around to high school students and they naturally ask why they should spend their time in college to get into a job of this type that offered rather a "rugged" road to advancement, with poor pay.

Other Engineering Industries long ago decided that this method of obtaining and training men did not pay. Their present method of selection and careful training has paid dividends and is offering *serious competition* to the textile industry in the trained labor market.

In connection with the proposed training plan, we at Georgia Tech are planning to follow up on all new students who might be placed in the textile industry and where this program is worked out we want to supply our summer students, particularly, with *questionnaires* which will require some study while they are working in order for them to be able to answer the questions. When they return to school, we will examine them and determine what they have learned on their jobs. When men come to Georgia Tech from a town in which a mill is located, we would like so far as possible to return those men to that mill for their training. Neither the mill nor the student would be under any obligation to form a connection at the end of the training period but if it were mutually agreeable, it would be a fine thing to do and we believe that in most instances it would work out in that manner. By following the progress of the student in the mills, we will be in a position to spot the strong and weak points in our teaching and if we find a man who does not fit into the textile picture, then with the cooperation of the mill management, we should remove him immediately. We may try him in another mill where he might fit in better with the organization but there probably will be circumstances under which we may find that a man is completely unsuitable for textile work. After careful consideration, we should definitely advise the man to try some other type of work where he would be more satisfied and happier.

This program will require close cooperation on the part of the mills and it is our desire to work with them in every manner possible in order to develop the proper type of textile man. Our greatest difficulty at the present time will be in having a sufficient number of students to go around. I should like to be in a position to have enough students whereby we could place a number each year into the different mills over the State. In order to do this, we are going to work in every way that we can to build up a student body in the textile department but we definitely must have your help in putting students into our school. We cannot do this alone and get the type and number of men now needed. If we start out immediately with a maximum number of students in the Freshman class who sign up to take textiles, it will be four years before you can begin to see the results of this program, therefore, we want to get this started immediately and are depending, to a large extent, upon the mills of this State to supply prospects. With the proper incentive for the students, with the proper type of teaching at Georgia Tech, and with the cooperation of the mills, we can do the job.

TEXTILE BUILDING

Among our plans for future work at Georgia Tech, we are proposing to build a new textile building. There is not sufficient room in our present building for the addition of new types of equipment which we will need, therefore, this room will have to be made. We already have drawn up tentative plans and also have submitted a list of equipment in the present building which should be discarded immediately, new equipment which should take its place immediately, and additional equipment will be necessary for a new building in order that we may have sufficient machinery to take care of synthetics, cotton and wool, as well as more modern equipment for a Dyeing and Finishing Department. The office and classroom facilities in the present building are inadequate. The proposed plans for the new building will be modern in every respect and we expect to air-condition the operating area in order to enable us to operate under the most modern mill set-up. As you probably noticed recently in the paper, we hope to be able to start this building in 1947.

RESEARCH

One of the functions of the textile school is research. At the present time, textile research projects are being carried on at Georgia Tech and we hope to have these increased as time permits. It seems to me that at the present time the field is wide open in this section of the country for cellulose research and research on cotton. Cotton research has been neglected, and it is only in the past few years that much serious thought and research has gone into this product. It is my firm belief that there will have to be a concentrated research program, such as has been done on synthetic fibers, in order for us to determine what can best be done with cotton. This must be done through the cooperation of your textile schools, textile institutes, machinery manufacturers and textile manufacturers. I believe that we may find new uses for cotton as well as improvements in current fields into which cotton goes. We still are not getting the best strengths and uniformity in our cotton yarns.

These factors open up the possibility of research into cotton manufacturing machinery, improved mill technique, and chemical and physical research. It is our hope that as various problems arise, we may be able to work with the different organizations and mills in the development of various products. This is a function of our textile schools as much as teaching and where research is being done, the student obtains this point of view in addition to his operating point of view. Such a background can be invaluable when the student enters industry.

(Concluded on Page P164)

MODERN SALT AND BRINE USAGE IN TEXTILE PLANTS*

NORMAN M. AGNEW

Field Engineer, International Salt Co., Inc.

YOU probably think of salt in the textile mill as a sort of necessary evil—a raw material in which none of you is particularly interested—or even care to be interested. The salt comes into the plant; you truck it around to the dyeing vats and machines and the zeolite water softener, and that is that. There seems to be nothing more to be said about salt.

I hope to prove to you that salt is of very direct personal interest to every textile chemist and every mill superintendent. The textile chemist is interested in the quality of the work and the superintendent is interested in the cost of the work. The handling or the mishandling of the salt affects both quality and cost — not in theoretical, far-off ways but in direct, immediate ways—ways you have to come to grips with every day you work. I am going to talk to you about the relation of the salt to your quality and costs.

For the last ten years, I have been doing technical work on the handling and the application of salt and brine in the textile mills in the Piedmont and Southeastern and South-Central textile districts. I have called on most of the mills in those districts. I have seen their processes and compared one mill with another. It has been my privilege to see a complete revolution in the methods of storing, dissolving, distributing and applying salt in textile plants during those ten years. In fact, it has been my privilege to help in bringing about that revolution.

Let me outline the bare fundamentals of your salt problem. You use a lot of it, and whether you like it or not, you have got to store in somewhere. Then you have got to get it out of storage and spread it around to the dyeing vats and machines and zeolite softeners somehow. How are you going to do it?

When the salt comes in on the railroad siding, you would naturally like to store it just as close to that siding as you could get it. But maybe such a location is too far away from the dyeing machines. So you decide to store the salt in the dye house or as close to it as you can get. Probably the location isn't particularly happy for either storing or distributing but is a compromise and the best you can do. So much for the storage.

Now for the distributing. The salt is in the storage pile and you have got to get it into a wheelbarrow or a buggy or something to cart it around in. That means handling the salt twice—once to get it into storage and once to get it out. Then you have got to trundle the buggies of salt up and down aisles to get it to the dyeing machines. Men have to stop other work to carry the salt around and they interfere with other operations while they are running up and down the aisles. They spill salt on the floor. Then too, you have got a salt measuring problem at the dyeing machines, and I am going to speak of that in a moment. You also have a salt dissolving problem in the dyeing vat or machine itself when you use dry salt.

Now, it is not my purpose in this talk to review the physical chemistry of salt as an exhausting agent in the dye bath or the way it acts on the zeolite in the water softener. However, I must point out that the salt has no effect whatever in the dyeing machine or the softener until it is dissolved—it has to be in brine form before it acts. This leads to a very obvious thought.

If the salt has got to be used as brine, why not dissolve it in some kind of tank right at the storage bin and then pump the saturated brine around instead of horsing the dry salt around. If you do that, you can store the salt anywhere you please and dissolve it right beside the storage pile—even in a shed hundreds of yards away, as many mills are doing right now.

Let me apologize for the advertising nature of Fig. 1. However, it perfectly illustrates my point so I had it made up from one of our published advertisements. Just notice the troubled path of the fellow carting dry salt around, then compare it with brine flowing from a salt dissolver through a pipe to dyeing vats, dyeing machines, and water softeners. The brine doesn't have to flow by gravity. Usually you pump it with a cheap 1" or 2" pump.

Now how do you dissolve the salt? This seems easy. You throw a handful of salt into a pail and stir it with a stick. This is just dandy until you start to deal with a ton of salt or a 50-ton carload of salt. Also, you insist that the brine be fully saturated and perfectly clean and clear. Also, you insist on using rock salt instead of evaporated salt.

Right here let me digress and speak of the difference between rock salt and evaporated salt. Almost all salt comes from the ground. It is in a layer of solid rock salt probably 1,000 feet under the surface.

The cross section in Fig. 2 shows the surface of the ground and a layer of rock salt underneath. You can get the salt up to the surface of the ground in two ways. One way is to sink a well down to the salt deposit and force water down—dissolve the salt and pump the brine back up. Then the water is evaporated by boiling the brine and the salt is recovered as a fine-grained evaporated salt or vacuum pan salt. Table salt is a common example of evaporated salt.

The second way to get the salt up to the surface is to sink a shaft, send miners underground, and mine out the solid rock salt just as if it were coal. The salt is hoisted up and crushed and screened into different sizes ready to sell and use. A very common rock salt size is about the same as a pea or bean. This size used to be called ice cream salt.

The differences between rock salt and evaporated salt are very important and are not always appreciated. First of all, rock salt is usually much cheaper than evaporated salt. Second and very important, the grains are so much coarser than those of evaporated salt that rock salt does not freeze in winter or cake in wet weather. It is always free-flowing and handles easily, whereas, evaporated salt often cakes so hard in the bin that a pickax is needed to loosen it. The only disadvantage of rock salt is that—being a mined salt—it contains 1 to 1½ per cent of shale or insoluble matter. This means that rock salt should preferably not be thrown directly into a dyeing machine as the particles of shale cut bearings and get tangled in the goods. The rock salt should be dissolved by a method that will leave the insoluble shale particles behind, so only a very pure and very clear saturated brine is pumped to the dyeing machines. How is the rock salt going to be dissolved?

Fig. 3 shows one of the very earliest and crudest salt dissolvers, patented back in 1897.

The salt is dumped into the barrel and water enters through the pipe grid in the

*Presented at meeting, Mid-West Section, October 20, 1945.

DOES THIS WASTE OF MAN-HOURS EAT UP THE PROFITS IN YOUR PLANT?
Follow this worker and count the steps wasted
AUTOMATIC FREE-FLOWING BRINE SAVES WASTE!
for your DYEING VATS
for your DYEING MACHINES
for your ZEOLITE WATER SOFTENER

Fig. 1
Comparison of Trucking Salt vs. Piping Brine

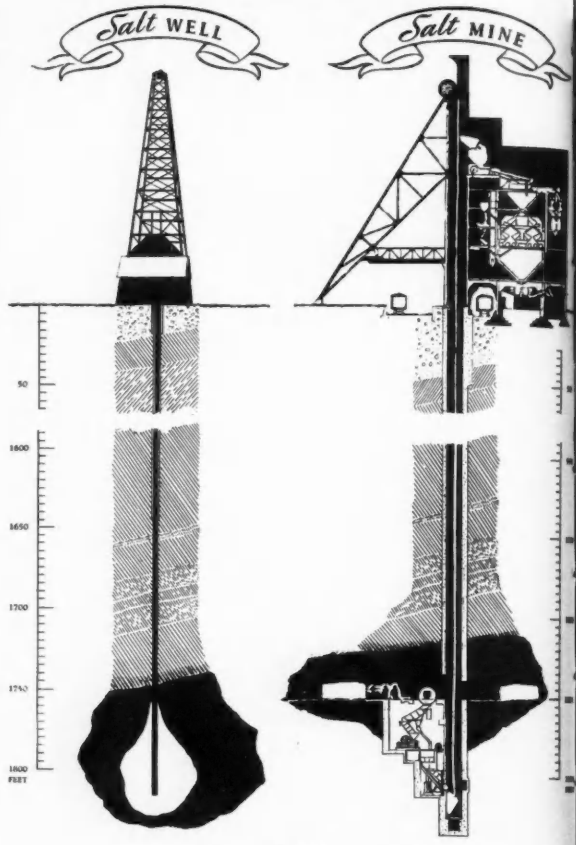


Fig. 2
Cross Section of Salt Well and Salt Mine

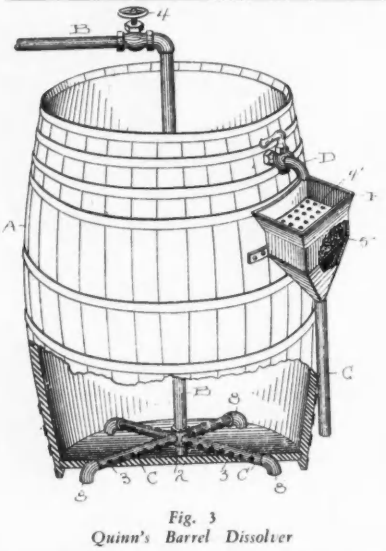


Fig. 3
Quinn's Barrel Dissolver

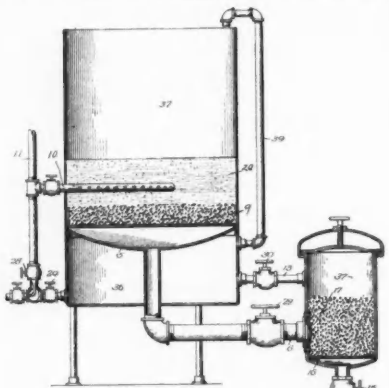


Fig. 4
Oxley's Brine Purifier

bottom and flows up through the salt. Then it overflows into a small filter box on the side of the barrel packed with sponges. This sounds all right, doesn't it? However, it is a batch process—not continuous. Also, it is impossible to get the water to upflow evenly, particularly in a big tank. It always channels and the brine is unsaturated. The upflowing brine carries suspended fine salt and fine insolubles. In theory the suspended matter is caught on the sponge filter. Actually, the sponges are always plugging up and have to be cleaned. Further, the sponges are a very poor filter and the brine is muddy.

Fig. 4 shows Oxley's 1924 patent. Salt fills the tank and is supported on a gravel bed which is in turn supported on a metal screen. Water enters the perforated pipe and the brine flows down through the gravel into a collecting chamber below the screen. It flows through a pipe into a separate filtering drum containing gravel. The brine is often very weak but the filter does a fairly good job if it is large enough and cleaned often enough. However, gravel doesn't belong in a salt dissolver — it belongs outdoors on the ground. Furthermore, this device requires a rather complicated mass of piping and miscellaneous gadgets.

Fig. 5 shows the Lixator rock salt dissolver patented in 1933. I am going to describe this dissolver with considerable enthusiasm—not because I am directly associated with it—but because, looking at it strictly as an engineering proposition, it seems just about perfect for the purpose. It is only a round tank with a conical bottom. There is a false bottom inside, also cone-shaped. This false bottom is not a screen or filter but a steel plate cone with a large throat opening. There is nothing else inside the tank. It is completely filled with salt from an overhead supply. Water enters through a distributing nozzle and the liquid level is held at the top of the tank by a float valve. The water passes down through the salt and becomes fully saturated brine by the time it has percolated half way down. Since the brine is fully saturated at the halfway

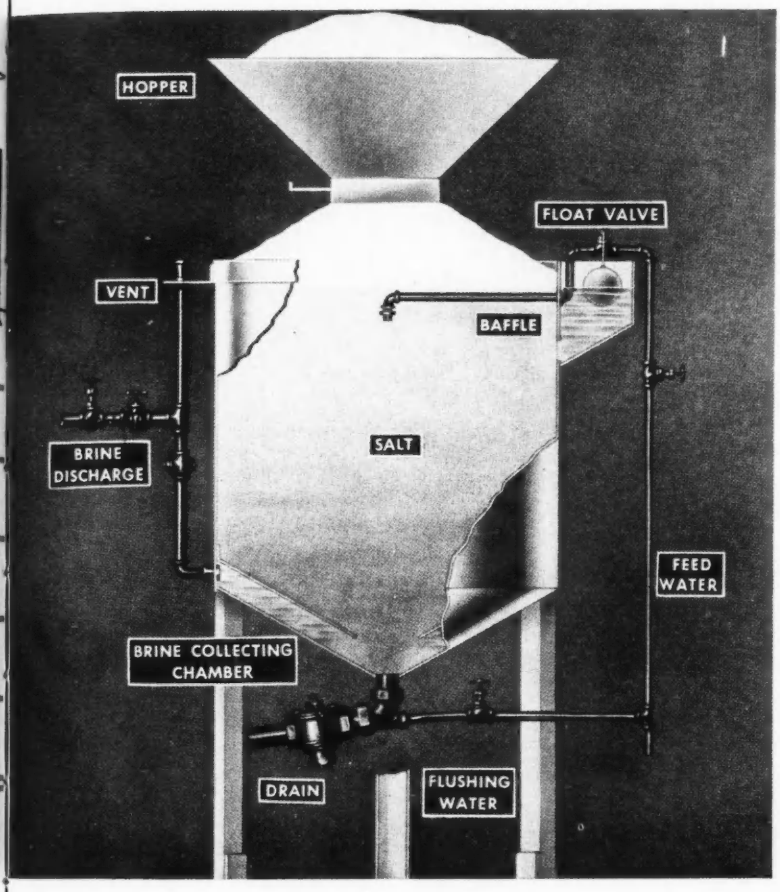


Fig. 5
Cross Section of Lixator

point, it can't dissolve any more salt. Therefore, the salt in the lower half of the dissolver is a perfectly inert material —just as if it were sand or gravel or sponges. The salt itself acts as a filter if the brine is saturated before it gets to the filter-bed part of the salt. The water flowing downward becomes first a fully saturated brine and then a filtered brine and then flows into the chamber under the false bottom and flows out into the discharge pipe.

As fast as salt is dissolved, more salt flows in. Since it is coarse rock salt, it flows freely, and stops on its angle of repose. There are no feed gates to open and close and the salt feed is automatic. The dissolving water starts and stops automatically and all the operator has to do is open and close a valve in the brine discharge line accordingly as he needs the brine.

After a large tonnage of salt has been dissolved, quite a lot of insoluble matter accumulates in the filter bed and eventually slows up the brine flow. To clean the dissolver the salt feed is stopped and the drain valve opened and the insoluble matter flushed out to the sewer.

The trade name, Lixator, comes from the word lixiviate which means to separate soluble and insoluble material by washing or dissolving it out with a solvent. Here the solvent is fresh water.

The Lixator may seem absurdly simple, but I must warn you that it is not artless but the height of art. You must have the right size of salt, the right rate of flow, and the right ratio between the dissolving and filtering zones. All three factors must click at once, and this will explain why such an apparently simple device was not invented a hundred years ago.

Fig. 6 shows the outside appearance of a Lixator with a wooden overhead feed hopper, filled from the floor above.

Fig. 7 shows a Lixator installed at Princeton Knitting Mills, Watertown, Conn. This Lixator has a salt storage hopper instead of an overhead feed. The salt is shovelled into the hopper from a pile on the floor or else dumped in from bags. This is very typical of most Lixators in mills using a moderate amount of salt.

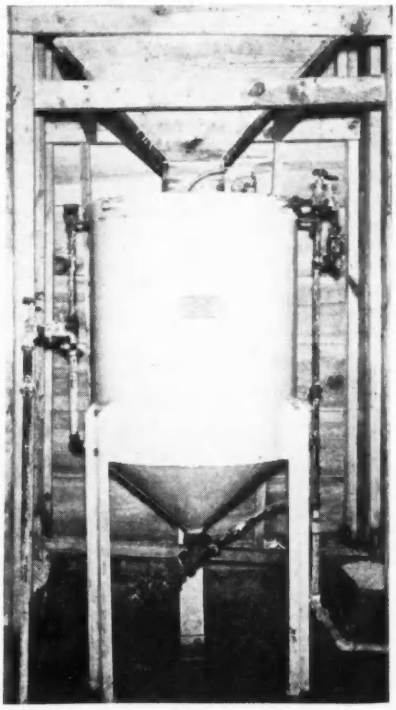


Fig. 6
Lixator showing overhead feed

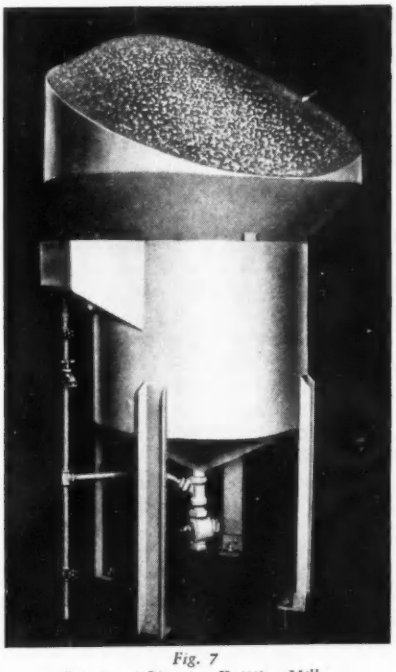


Fig. 7
Lixator at Princeton Knitting Mills, Watertown, Conn.

Fig. 8 shows some typical ways to feed Lixators. The sketch on the left shows a

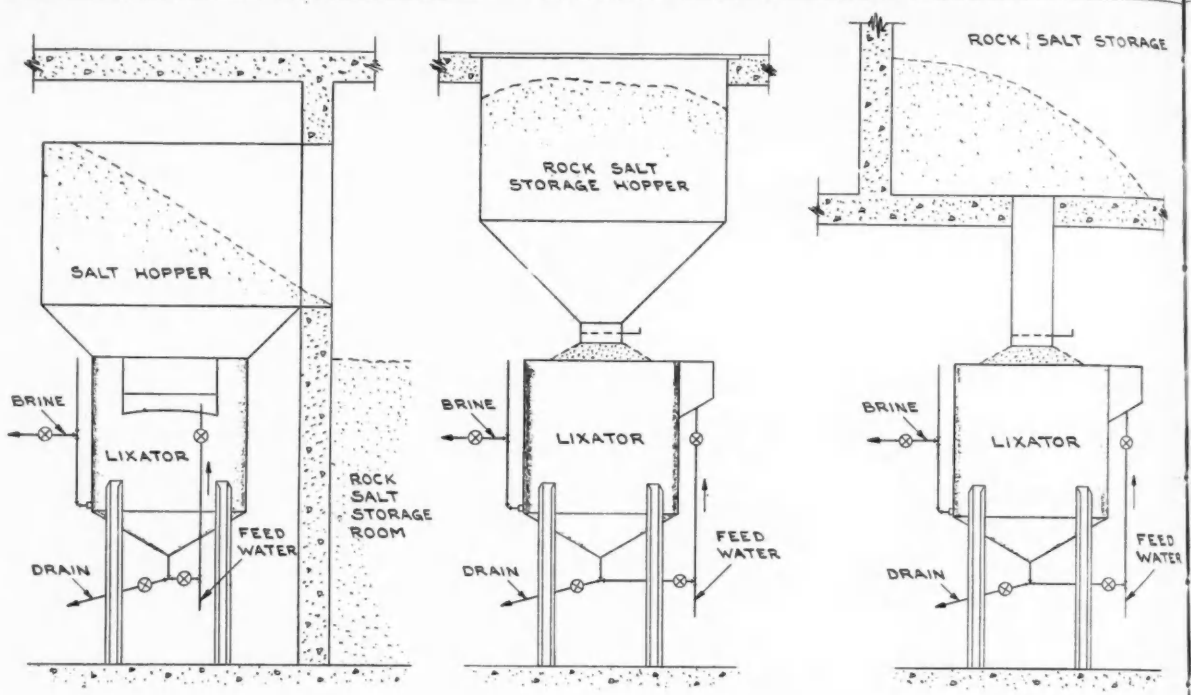


Fig. 8
Lixators with Various Types of Rock Salt Storage

wall type hopper. The hopper is bolted right up against an opening in the storage bin wall. The operator stands on the salt in the bin and shovels it through the opening into the Lixator hopper just as fast or carelessly as he pleases. No salt falls on the floor around the Lixtor.

The type of Lixator which is described can be made in sizes up to 10′ or 12′ in diameter and is all very well for a moderate tonnage of salt or wherever you can have an overhead storage for gravity salt feed into the Lixator. However, suppose you are a very large salt user, and suppose you want to get the salt off the railroad track with one handling and never touch it again—just pump the brine. Then we have to apply the Lixate principles to tanks which hold anywhere from one to ten carloads of salt, and here is how we do it.

Fig. 9 shows a silo type Lixator installed by Cedartown Textiles at Cedartown, Georgia. We just apply the three Lixate principles on a large scale in the shallow concrete tank which acts as a support for the wood storage silo above. The wetted portion of the salt and the brine are inside the concrete tank. The dry salt in storage —several carloads—is held in the wood silo part of the Lixator and drops down into the concrete tank as fast as the salt below is dissolved. The salt is lifted into the silo by a bucket elevator.

We are rather proud of these silo type Lixators having invented them. They don't require much concrete because the main salt storage is in the relatively cheap wood stave silo. They are the cheapest and simplest combination of salt storage and salt dissolver ever invented.

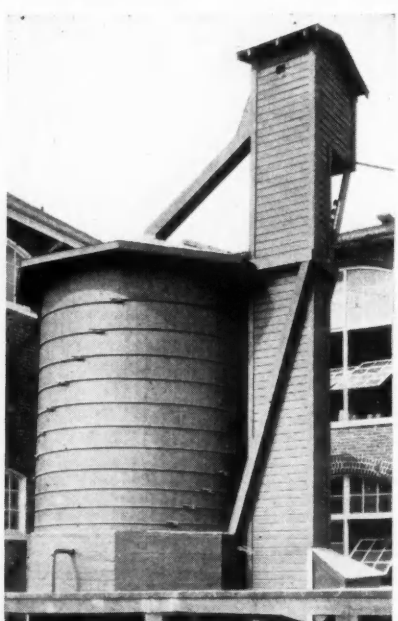


Fig. 9
Storage Lixator at Cedartown Textiles, Cedartown, Ga.

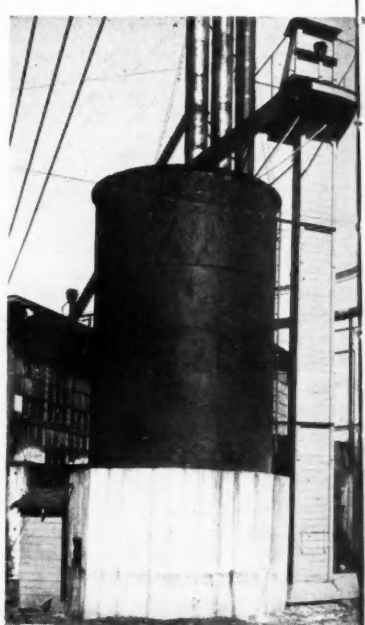


Fig. 10
Silo Lixator at Standard-Coosa-Thatcher Co., Chattanooga, Tenn.

Fig. 10 shows another silo type Lixator, installed by Standard-Coosa-Thatcher Co. at Chattanooga. The silo is steel and

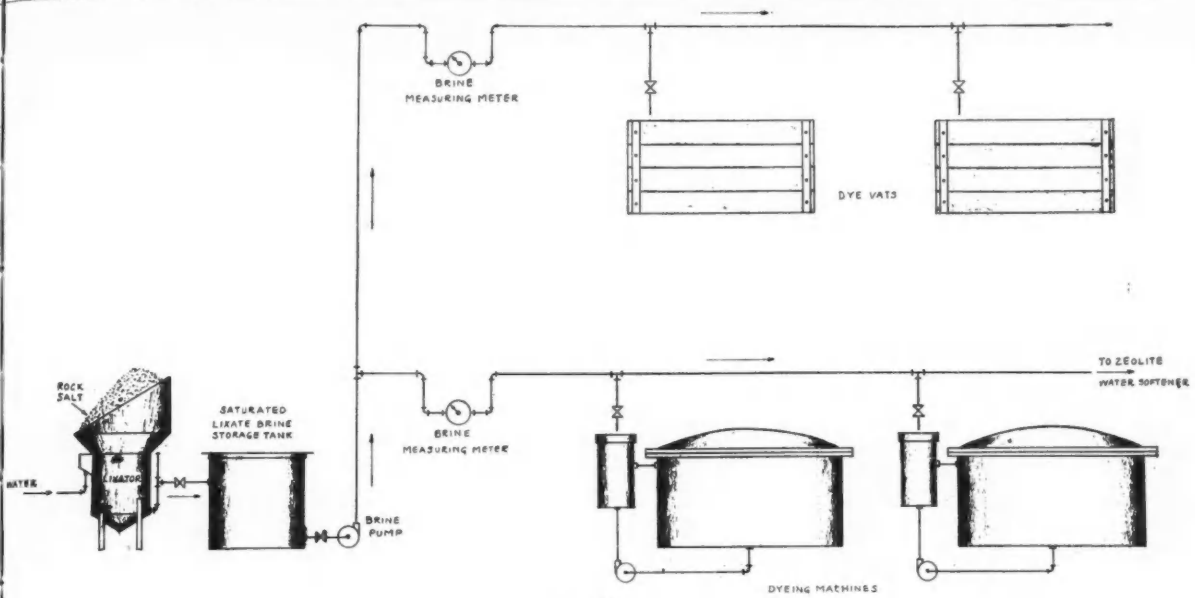


Fig. 11
Flow Sheet Showing Lixator in Textile Mill

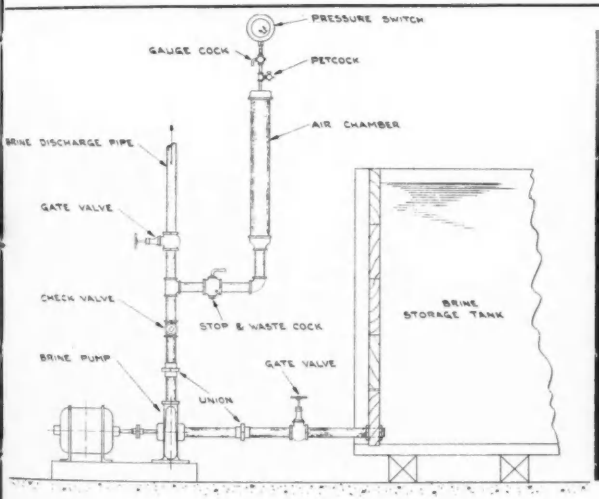


Fig. 12
Typical Pressure Switch Arrangement for Brine Pump

Fig. 13

there is quite a lot of concrete—it's twice as high as you would expect because the upper half only is used for the Lixator and the lower half is a brine storage chamber.

American Finishing Company at Memphis, Tennessee, have two silo Lixators fed by the same bucket elevator.

We also can apply the Lixate principles to rectangular concrete tanks. We have applied these principles to tanks as much as 12' wide by 60' long, holding over 300 tons of salt and dissolving the salt at a rate of over 14 tons per hour. Macon Textiles at Macon, Georgia, has one of these rectangular type silos, and Dan River and Riverside Mills at Danville, Virginia, has four of them.

Bear in mind that the whole strategy of saving money in the salt purchasing and handling is to use coarse, free-flowing rock salt and store and dissolve it with as little handling as possible and just as close to the railroad siding as possible, and pump the brine to the points of use. Note that this brine is fully saturated and is crystal clear and very pure.

Most evaporated salt averages ½ per cent or more dissolved impurities, mostly calcium sulphate with a little calcium chloride and magnesium chloride. Rock salt contains about 1 to 1½ per cent impurity which is mostly insoluble, and, therefore, stays behind in the dissolver. The impurities in rock salt brine are of the same kind as in evaporated salt brine, but rock salt brine will average considerably lower than evaporated salt brine in the actual quantity of the impurities present.

Now I would like to speak of brine distribution. In Fig. 11 the flow sheet shows the principle of distributing the brine from the Lixator whether the latter is a small metal one or a large silo or storage type Lixator. The brine usually flows from the Lixator to a small storage tank and is pumped to the points of use by a centrifugal pump of all iron or all bronze construction.

The brine pump can be controlled by push button stations at several points, but most customers control the pump by a

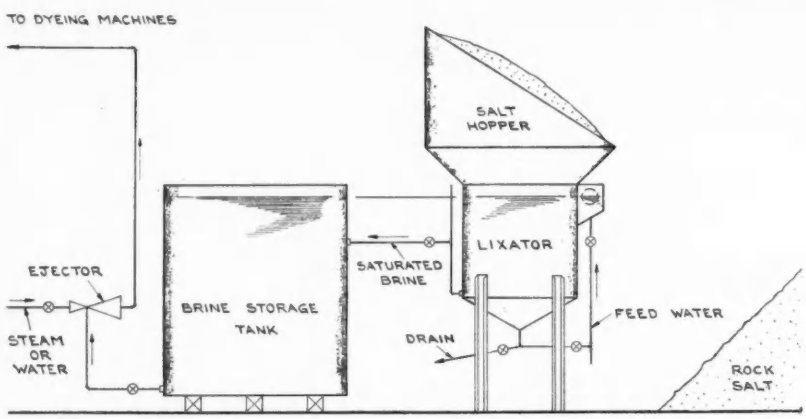


Fig. 14
Lixator and Brine Storage Tank at Same Liquid Level

HOW MUCH SALT IS A SHOVELFUL?
May be 10 lbs.
May be 15 lbs.
May be 20 lbs.
HOW MUCH SALT IS A PAILFUL?
LOOSE
COMPACT
May be 25 lbs.
May be 35 lbs.
IS THE 100 lbs. ALL SALT OR PART MOISTURE?
A GALLON OF LIXATE BRINE IS ALWAYS 2.65 POUNDS SALT
2.65 Lbs. Salt
2.65 Lbs. Salt
2.65 Lbs. Salt

Fig. 17
Various Methods of Measuring Salt

pressure switch in the discharge line, as shown in Fig. 12. The pressure switch is connected by electrical wiring to the pump starting switch. When any valve in the brine discharge pipe as opened to draw off brine, the pressure in the line drops and the pressure switch automatically starts up the motor and pumps brine until the pressure is built up again. Really it's just as simple as turning a water valve off and on. The salt feeds automatically, the water feeds automatically, the salt dissolves automatically—all you do is open and close a brine valve.

The installation in Fig. 13 happens to be in a tannery, but you'll notice how simple the pressure switch layout is.

Small dye houses very satisfactorily use a steam jet pump or steam ejector for pumping the brine. This is very simple and economical and also heats the brine with the operating steam which you would use in any case for heating. Note that in Fig. 14, this particular layout shows a brine storage tank with its liquid level matching the liquid level in the Lixator. When the ejector starts to draw off brine, the drop in the storage tank level causes the Lixator to automatically start up and run brine into the storage tank until it is full again. Then the Lixator automatically stops flowing. All you do is start and stop the ejector. Everything else is automatic.

Fig. 15 shows a Lixator with the top matching up with a brine storage tank, and also shows a wall type hopper fastened to the side of the storage bin. You will notice how neat everything is.

Fig. 16 shows another Lixator—hopper type—and brine storage tank with the two liquid levels matching. This particular installation is at Warren Fabrics Co., West Warren, Mass.

The last remaining problem is to measure the brine into the dyeing machine. Believe it or not, measurement of saturated brine is far more accurate than any other type of measurement.

Notice the various ways of measuring salt, shown in Fig. 17. Operators sometimes measure salt by using say six shovelfuls or ten shovelfuls per machine. This is obviously inaccurate and always wasteful because the operator is going to always play safe and use plenty of salt. Measurement by the pailful or other bulk container for dry salt is equally bad for the same reason.

You may think weighing on a scale is truly accurate. It would be if you could dry the salt to take out the moisture. As it is, salt may have a water content as high as 6 or 8 per cent. Actually ,the very best way to measure salt on a commercial scale is to measure it as saturated brine. A gallon of saturated brine at 60° Fahrenheit contains exactly 2.65 pounds of salt. The question is often asked as to whether or not the temperature of the

Fig. 15
Lixator at Nathan H. Poor Co., Peabody, Mass.

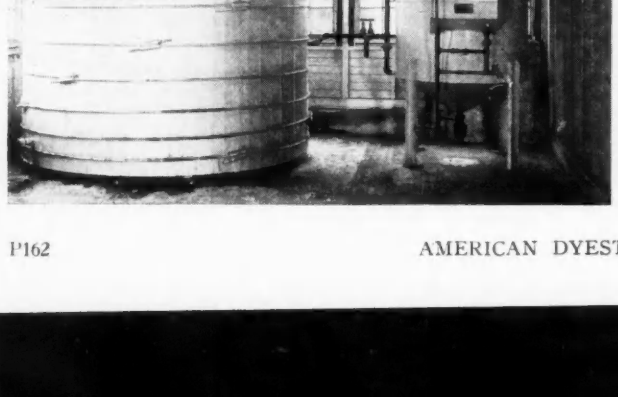
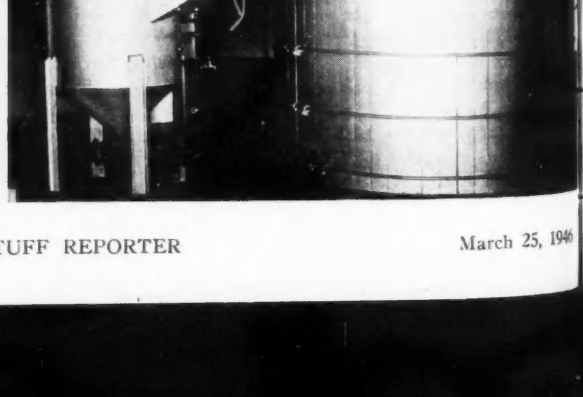


Fig. 16
Lixator at Warren Fabrics Co., West Warren, Mass.



ater has any effect on the amount of salt issolved. Oddly enough it doesn't. To art with, the solubility of the salt in-eases only slightly with rising water mperature. Then we have the important ct that the water and the brine expand ightly on heating.

If we take a gallon of brine at 60° ahrenheit holding exactly 2.65 pounds of lt and heat it, we have slightly more han a gallon of brine holding slightly lore than 2.65 pounds of salt. If we take xactly one gallon of this heated, expanded rine, it will have exactly 2.65 pounds of lt just as before.

The easiest and most satisfactory and ost accurate way to measure brine is to nstall a flow meter with a large vertical ial in the brine line. The meter can be ead at a considerable distance and one eter can serve a large number of dyeing achines. These meters are very popular n southern textile mills. The meters are alibrated in tenths of a gallon and the ands can be reset so the operator does ot have to do any figuring or subtracting.

The selective quantity auto-stop meter s also very popular and is the greatest ossible refinement in brine measurement. The meter is set for a given quantity of rine and as soon as this quantity has assed through, the valve automatically loses.

When you have a storage type dissolver nd a pump operated by a pressure switch nd an auto-stop meter, your entire salt perations are just as nearly automatic as t is humanly possible to make them.

Let me call your very particular attention to the fact that all of this equipment is very simple, very rugged, and very inexpensive. There is nothing complicated and nothing to get out of order.

Saturated brine is more efficient as the exhausting agent than when dry salt is used directly in the machines, saving on an average 15 per cent of the salt required for all types of dyeing. One gallon of saturated brine contains 2.65 pounds of salt but when used as the exhausting agent, one gallon of saturated brine appears to be equivalent to 3 pounds of dry salt. This is the figure used for best dyeing results, by actual experience.

In closing this talk I will list and then answer the four questions that naturally come to the mind of a chemist when seriously considering the installation of brine in his dye house.

Question No. 1. Will brine cause the dye to exhaust too fast at the point where it first comes in contact with the material in the machine, thus causing heavy spots and uneven shades?

No; brine does not cause spots or streaks and uneven dyeing. On the contrary, when brine is admitted to the dye machine or expansion tank at the rate of 10 to 15 gallons per minute, there is such a small amount of brine by comparison with the total water volume being circulated in the bath, that actually the brine is very rapidly diluted to a very weak solution and is so thoroughly dispersed throughout the whole bath that a relatively slow exhaustion is obtained, which in turn produces uniform and level shades. Contrarily, dry salt when thrown directly into the machine, produces a very high salt concentration at that point; thus salt stains are caused. When making brine installations in hosiery dye houses, we insist on a test for the benefit of the operator. We have the hose on the end of the brine line placed in the end of the dye machine and all the brine admitted at one point to prove that brine added in the simplest and most concentrated manner will not cause the bath to exhaust unevenly.

Question No. 2. How can we accommodate the additional liquid volume contained in the brine, without overflowing the machines or expansion tanks.

We will use as an example to illustrate this point, the vacuum type raw stock kier, capacity 1000 pounds of cotton, with the standard 36 by 36 inch expansion tank. Assume we are dyeing one of the very heavy shades that will require 300 to 400 pounds of salt or 100 to 133 gallons of brine to exhaust. The procedure here would be to draw the water down as low as possible after the heating, and just before adding the dyestuff. Now, at the time you are ready to add the brine, put in that portion of the total which the expansion tank will hold. This will be approximately one half of the brine. Circulate the bath with this portion of the brine for about one half the time for exhausting, then dump enough of the bath to accommodate the balance of the brine. This will give you an excellent quality of dyeing with practically no loss of dye. We have found from experience that 50 per cent of the total amount of the brine will exhaust 90 per cent of the dye but it does require the other 50 per cent of the brine to exhaust the remaining 10 per cent of the dye.

Question No. 3. Will not the additional water in the brine upset the water ratio to pounds of material being dyed?

Answering this question, we can say that the additional water in the brine will have no effect whatsoever on the shade, for at this late stage in the dyeing cycle all the dye has been exhausted insofar as it can be accomplished by the use of water, heat and circulation. Therefore, finally, to get the full benefit from the dye, the exhausting agent is added to the bath to drive the remaining dye out of solution and onto the material. For this reason the water volume at this point is of no consequence. I believe the majority of chemists will frankly admit that better dyeings are obtained when the water ratio is on the long side, rather than with too little water. This very condition can often be observed in a hosiery dyehouse, when they are completing the dyeing of an order of a certain shade. On the last run they will only have the machine loaded to a small percent of its capacity and will reduce the amount of the dye proportionally, but will fill the machine with the same amount of water as when it is loaded to capacity with material. The water ratio here is far in excess of that for the full load in the machine, but yet the last little batch matches the shade of the balance of the order.

Question No. 4. Will the brine added to the dye bath at atmospheric temperature affect the quality of the dyeing, or prolong the time normally required to obtain the full and complete results from the dye?

Answering the fourth question, we can say that adding the brine at atmospheric temperature does not appear in any way to have affected the quality of the dyeing nor does it retard the operation. In many tests made, we have never lowered the temperature of the bath more than five degrees and this light drop in temperature lasted only for the length of time required to add the brine to the bath at the rate of ten to fifteen gallons per minute. We have never been able to observe any bad effect on the finished material.

From what we have learned about brine as an exhausting agent from actual dye house experience in the Southern Field, I must repeat what has previously been said; that saturated brine does give an improved quality of dyeing, much more economically and with greater convenience than the use of dry salt.

RESEARCH COMMITTEE MEETING

(Continued from Page P148)

something of that sort, we have to have some means of comparing one lamp with another. Mr. Seibert has run many experiments on a lot of different kinds of materials, and we have also at the Bureau. We have been closely in touch with each other in that work. We have finally arrived at a dyed paper which when exposed for between 16 and 24 hours is fading at such a rate that you can visually distinguish between 10 per cent differences in time of exposure. In other words, you can distinguish between 18 hours and 20 hours and between 20 hours and 22 hours. Some people tell us they can distinguish between 5 per cent difference, but I am saying 10 per cent. I think that is safe.

Those papers have been studied relative to the fadings of dyeings. They have been picked because they do seem to be-

have on the average like dyeings. If the humidity goes up, dyeings fade at a different rate. They don't all behave the same way relative to humidity. This paper behaved on the average like dyeings. It behaves very well for changes in distribution and temperature.

We think it probably reproduces the behavior of dyeings with the varying conditions as much as anything we can get hold of.

The purpose of what we are doing, then, is to furnish the laboratory with papers which have been exposed in this standard reproduceable lamp for four different periods of time, 16, 18, 20 and 22 hours. You can then expose this paper in your lamp whenever you want to. You can do it daily or at the time of important exposures, and perhaps skip a few days, a week or two, depending on how accurately you want to calibrate your lamp. You can tell by comparing a sample exposed in your lamp for a certain period of time how it compares with the lamp in Washington.

Some of the lamps in the industry will fade materials in half the time our lamp will. Some of them take twice as long. The thing that is needed, other than actually changing the speed of your lamp, is to rate the samples in terms of the same standard hours. The purpose of the paper is to make that possible in a very simple, practical way. There is no costly equipment, no involved measurements. You don't have to make color measurements. You can do it visually, at least for a first approximation.

If we can get our lamps to within 10 per cent of each other, I think we will have very little more trouble with the lightfastness work.

I don't think that takes the place of the standard dyeings, as I said at the beginning. I think the standard dyeings will be used for a long time. I just think that it is another way of improving our light fastness testing. The committee is working on both schemes.

. . . Thereupon at 12:05 o'clock the meeting adjourned. . .

—♦ ♦—

GEORGIA TECH

(Concluded from Page P156)

The general proposed plans indicated in the preceding statements may be summarized briefly as follows:

1. To teach the students the fundamentals of textiles and related subjects covering the "why" of the job as well as the "how."
2. To revise and balance our textile curriculum.
3. To set up mill training courses for our regular students, in order to offer an incentive to obtain high caliber men.
4. To give practical mill training to members of the Faculty.
5. To plan for new textile building and equipment.
6. To follow all trends in Textile Research.

I would like to impress upon you that, in order to do any of the mentioned jobs well, we must have your confidence and cooperation.

—♦ ♦—

MEETING, SOUTH CENTRAL SECTION

THE Fall meeting of the South Central Section was held at the Patton Hotel in Chattanooga, Tennessee, Saturday, November 10, 1945. There were 100 members and friends in attendance.

After an informal dinner and entertainment the business meeting was opened by the chairman.

Dr. Raymond B. Seymour, Director, Industrial Research Institute, University of Chattanooga, delivered a paper entitled, "Facts and Fiction on Fibers and Finishes."

Note: This paper was published in the last issue. Ed.

The election of officers for 1946 was held and the following were elected:

Chairman—Clyde Horne, Dixie Mercerizing Co., Chattanooga, Tenn.

Vice-Chairman—W. K. Newman, Peerless Woolen Mills, Rossville, Ga.

Secretary — A. J. Nelson, Springfield Woolen Mills, Springfield, Tenn.

Treasurer—Bernhard Borrmann, Central Franklin Processing Co., Chattanooga, Tenn.

Councilor—Max Y. Parker, Holliston Mills of Tennessee, Inc., Kingsport, Tenn.

Respectfully submitted,
WILBUR K. NEWMAN, *Secretary*

Note: We apologize to the South Central Section for the late publication of this report. The copy was inadvertently misplaced. Ed.

—♦ ♦—

MEETING, PHILADELPHIA SECTION

THE meeting of the Philadelphia section was held on Friday, March 1, in the Burgundy Room at the Bellevue-Stratford Hotel.

The presiding chairman, Curt Baeringer, introduced the speaker of the evening, Jackson Woodruff, whose subject was "The Dyeing of Vinyon."

His talk was enthusiastically received and Mr. Woodruff obliged by answering all questions.

There were 155 attending dinner and 170 present for the meeting.

Respectfully submitted,
A. E. Raimo, Secretary.

MEETING, PIEDMONT SECTION

AT the meeting of the Piedmont Section on April 6th, at the Robert E. Lee Hotel, Winston-Salem, N. C., Dr. Donald H. Powers of Monsanto Chemical Co. will be the speaker at the Technical Session to be held Saturday afternoon. His subject will be "Plastics and Resins for the Textile Trade." Hobart Souther of the Proximity Print Works will lead the discussion on Dr. Powers' paper.

An interesting program is being arranged for this meeting including golf in the morning and a banquet in the evening. The banquet speaker will be Henry A. Alexander. Hotel reservations should be made directly with the hotel. Banquet reservations should be made with Roy J. Beauregard, Fairforest Finishing Co., Spartanburg, S. C.

●

CALENDAR OF COMING EVENTS

NORTHERN NEW ENGLAND SECTION:
Meeting: May 17.
Outing: June 7

RHODE ISLAND SECTION:
Meeting: April 26.
(Providence Engineering Society Hall, 191 Angell Street, Providence, R. I.)

PHILADELPHIA SECTION:
Meetings: April 12, May 24.

NEW YORK SECTION:
Meetings: March 29, May 3.
(Downtown Athletic Club, 19 West St., New York City.)

MID-WEST SECTION:
Meeting: May 4.
(Schroeder Hotel, Milwaukee, Wis.)
Outing: June 22
(Lake Lawn, Delavan, Wis.)

SOUTH CENTRAL SECTION:
Meeting: April 13

SOUTHEASTERN SECTION
Meeting: April 20.
(Ralston Hotel, Columbus, Ga.)

SUB-COMMITTEES:
Meeting: April 4.
(Hotel Commodore, New York City. Chairmen of sub-committees who wish to hold meetings should notify the chairman of the Research Committee.)

COUNCIL:
Meeting: April 5.
(Hotel Commodore, New York City.)

RESEARCH COMMITTEE:
Meeting: April 5.
(Hotel Commodore, New York City.)

PIEDMONT SECTION:
Meeting: April 6
(Robert E. Lee Hotel, Winston-Salem, N. C.)

NATIONAL CONVENTION:
Silver Jubilee Convention: December 12, 13 and 14.
(Hotel Statler, Boston, Mass.)

●

Outline of Stability of

COLOR MATCHING LAMPS*

Paper Prepared by HAROLD ELLSWORTH; Read by F. C. REINSHIELD

Analyte Instruments, Inc.

THERE are, of course, many aspects to be considered in evaluating a color matching lamp. Among these, constancy of spectral balance and reproducability are prime considerations. In this brief paper we will review the factors inherent in the principal types upon which stability and uniformity depend.

There are two types of sources:

I. The incandescent lamp

II. The gas discharge lamp

I. Let us first consider the incandescent lamp. Since no known filament material can be operated at anything approaching in the color temperature necessary for color matching, corrective filter becomes a necessary part of the lamp.

We then have the following variables to consider:

1. Change in spectral distribution of filament emission due to voltage changes.

   a. The magnitude of quality changes due to line voltage changes is far too great to be ignored. This variable may be substantially eliminated by using a regulating transformer which will maintain a constant voltage on the lamp over the line voltage ranges commonly encountered.

2. Change in spectral distribution of emission due to aging filament.

   a. The change in color of the filament due to aging, while important from a precision standpoint, is not great enough in lamps ordinarily used to affect utility as a color matching source.

3. Selective absorption of bulb due to filament evaporation.

   a. When we come to selective absorption of the bulb due to blackening, we have a variable which may seriously impair quality. The layer deposited in the bulb interior due to filament evaporation is not, as commonly thought, a non-selective blackening. It is a pronounced brown as shown by the accompanying spectral transmission of blackened bulb samples. (See Spectrophotometric Test graph.) This exhibit is intended to define the character of blackening and no life data are given since the degree of blackening will depend not only on time or burning, but the type of lamp and the position in which burned.

4. Selective absorption of reflector.

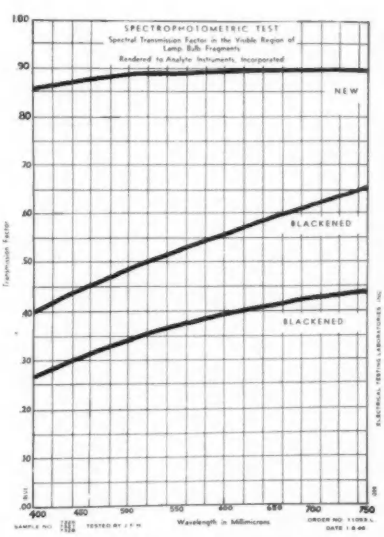
   a. The selective absorption of reflector is a problem common to all lamps. However, the selection of proper material and design can keep this variable within satisfactory limits.

5. Selective absorption of corrective filter.

   a. Like the selective absorption of the lamp bulb the absorption of the corrective filter is not easily controlled. In the laboratory, liquid filters may be used, but they are obviously impractical commercially.

The color of glass cannot be ac-

Analyte Color Comparator



Spectrophotometric Test Graph

*Presented at Meeting, New York Section, February 15, 1946.

curately controlled in manufacture and the transmission of samples from different pots frequently vary 15 per cent to 20 per cent at some wavelengths. Report No. 114 of the U. S. Bureau of Standards says: "Glass from different formulae, or different melts from the same formula, vary considerably." And: "The principal objection to daylight glass is that it cannot be accurately reproduced from specifications. This outstanding difficulty, together with its spectral irregularities in the yellow, green and red, would seem sufficient to prevent the general adoption of any of the known daylight glasses as working standard filters for the production of white light."

Unless the spectral transmission of each batch of glass is measured and the filters then ground to a computed thickness, photometric uniformity cannot be expected.

II. Now let us consider the second type of source—gas discharge lamp. This may be considered in three groups:

1. Gas discharge lamps giving bright line spectra.

a. The bright line spectra lamps may be dismissed since none have been found to have satisfactory spectral balance.

2. Gas discharge tube with fluorescent envelope.

a. The fluorescent lamps are subject to several variables difficult to control.

The quantity of emission of the fluorescent material varies with its chemical purity, the shape and size of particles, the binder used and the thickness of layer. In addition, changes take place during life.

While there may be limited use of such lamps in color matching, the above variables and the usual lack of satisfactory spectrum, preclude its use.

The "Marketing Service," a division of the Bureau of Standards, which tested this type of lamp, has reported, "The presence of the visible mercury spectrum in the energy distribution of the fluorescent tubes precludes an assumption for fluorescent lamps of duplicating north sky light."

Pronouncements of the largest makers of fluorescent lamps may also be considered authoritative. An authority in one company has stated that, "with all the wild and exaggerated claims that have been made for the virtues of fluorescent lighting as to its ability to be color correct, we know it to be very far from that, and make no hesitancy at all in stating that we should much rather consider it as a source of general illumination rather than one of either color-matching or color-correction."

3. Gas discharge lamps giving band spectra.

a. In the gas discharge lamp giving a band spectrum and using a non-selective clear glass envelope, we have a favorable set of factors.

The first lamp of this type, the carbon dioxide lamp, did not have quite the desired spectral balance, and the gas had to be periodically replenished.

The more recent development is a band spectrum lamp utilizing the rare gases and emitting light of very satisfactory quality, without a filter.

In this Type of lamp the voltage variable is, for practical purposes, eliminated, since any voltage sufficient to maintain a steady discharge will provide the same quality of light.

Dr. Chauncy Starr, of The Russell Sage Laboratory, Department of Electrical Engineering and Physics, Rensselaer Polytechnic Institute, reporting on a test of this type of lamp stated, "This light may be considered the equivalent of north sky light. The spectrum is completely continuous, consisting of overlapping bands. As far as I am aware, no other non-incandescent source gives a spectrum that compares with this one for continuity and lack of peaks."

—♦ ♦—

INTERSECTIONAL CONTEST COMMITTEE

WILLIAM D. APPEL, President, has appointed Patrick J. Kennedy to serve as chairman of the Intersectional Contest Committee for the contest which will be held in connection with the Silver Jubilee Convention in Boston on December 12th, 13th and 14th. Serving with Mr. Kennedy on the committee will be: Kenneth H. Barnard, Winn W. Chase, J. Robert Bonnar and Frank J. O'Neil.

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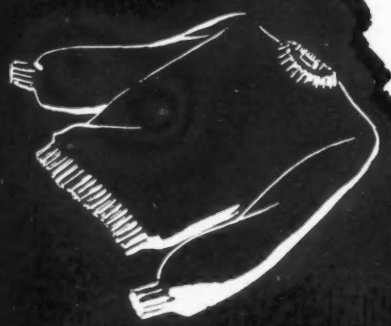

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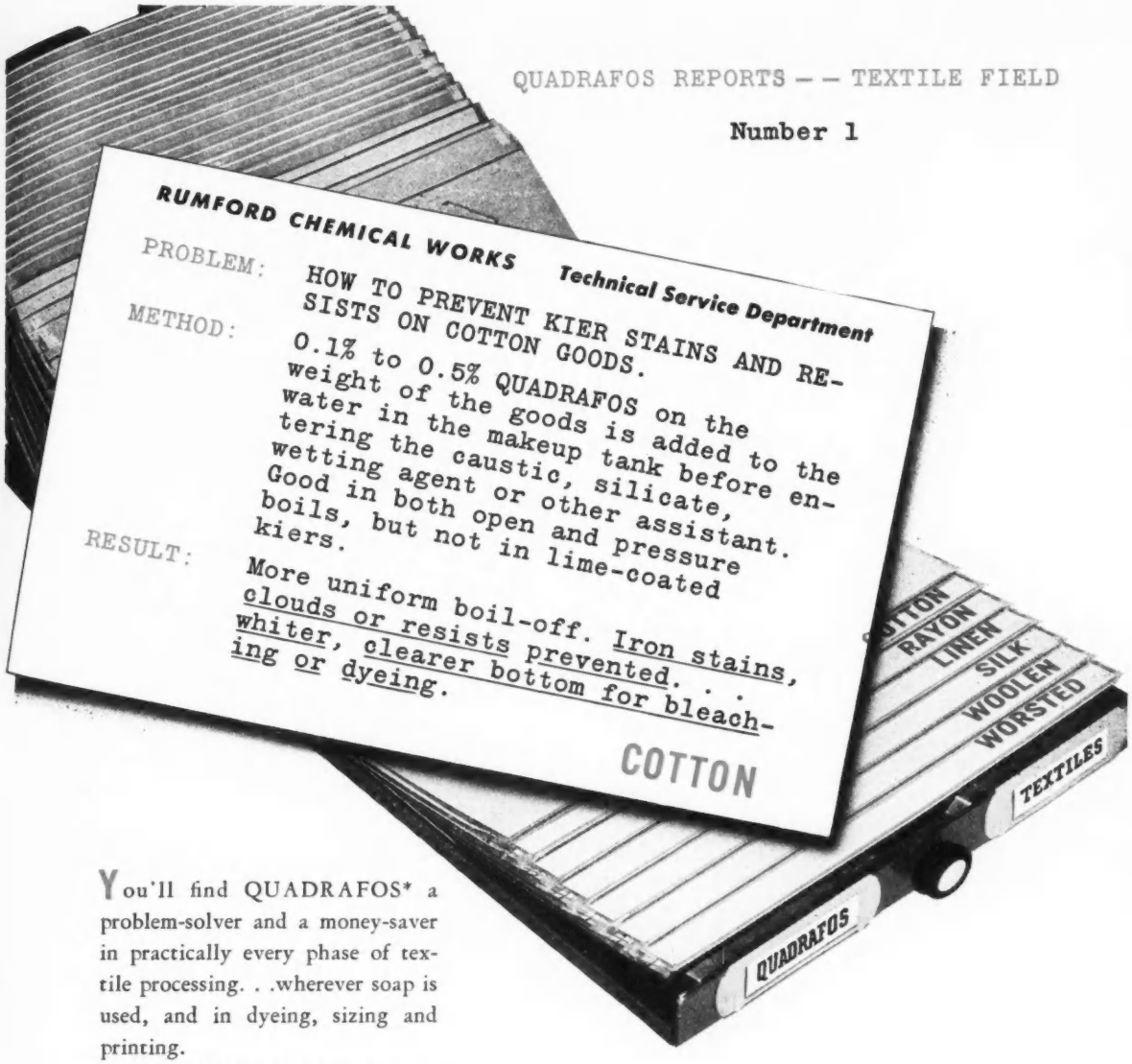
Number 1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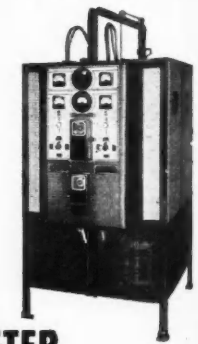

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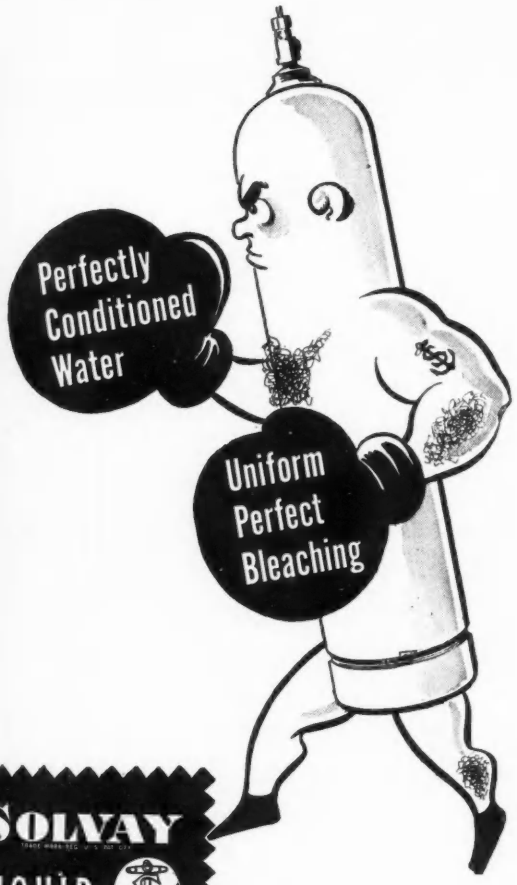

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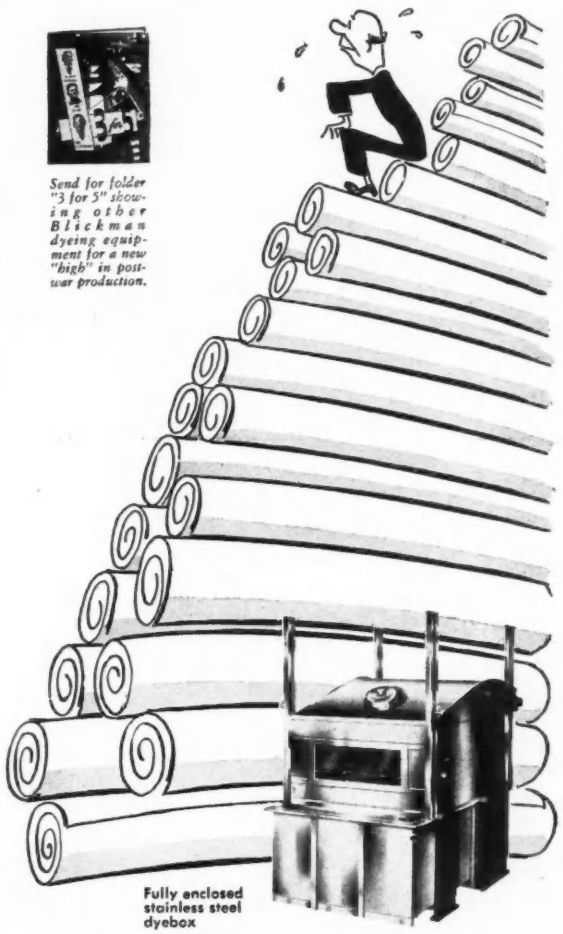

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—General Douglas MacArthur

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He knows that wherever your fighting man went, your Red Cross went, too—that wherever, whenever he needed respite and recreation, help with a personal problem, or just someone to talk to, the Red Cross was there.

He also knows, as you do, that your Red Cross cannot yet say, "Mission accomplished." It still has an enormous task to do. With your help, it will carry this task to a successful completion.

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Your Red Cross must now fight on three new battlefronts. The thousands of our men still in veterans' hospitals and in faraway lands overseas need its comfort and cheer now, as they did when the bombs were bursting. And as our servicemen return to civilian life, your Red Cross must lend them a helping hand.

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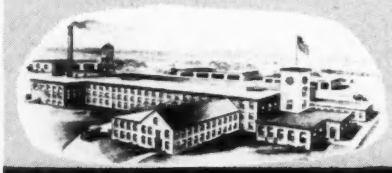

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POSITION WANTED: Married man 35 years old, 18 years experience bleaching, dyeing and finishing cotton and rayon piece goods, 10 years as supervisor, working knowledge of raw stock and package dyeing at present employed in standardization lab of dyestuff manufacturer. Desires a change. Write Box 840.

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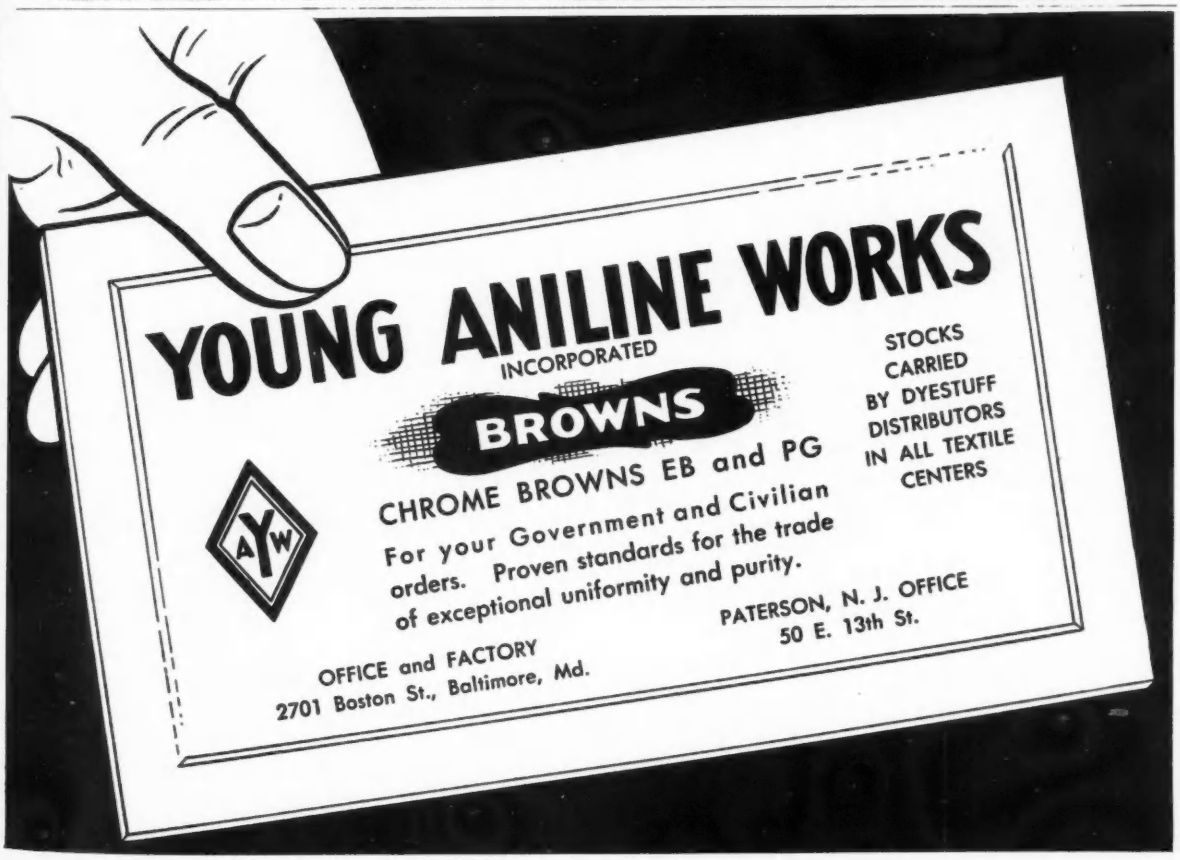
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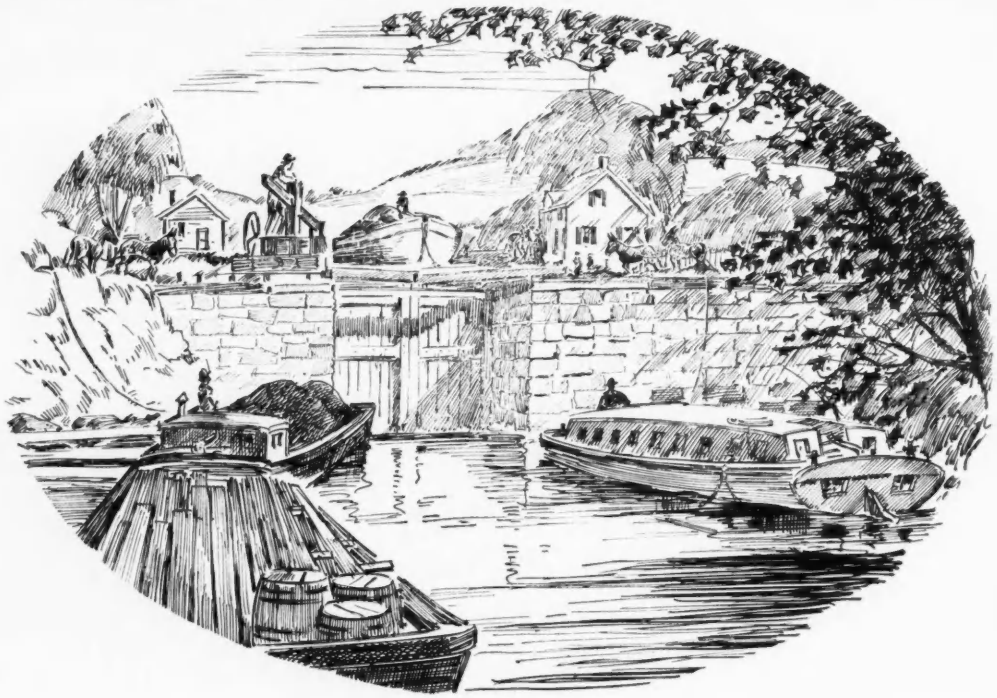

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